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ABSTRACT

This competency-based secondary learning guide on understanding the impact of new technology is part of a series that are adaptations of guides developed for adult consumer and homemaking education programs. The guides provide students with experiences that help them learn to do the following: make decisions; use creative approaches to solve problems; establish personal goals; communicate effectively; and apply management skills to situations faced as an individual, family member, student, and worker. Each learning guide includes the following sections: a general introduction and guidelines for using the material; a checklist for users for advance planning; introduction to the guide; specified competencies, with student outcomes/evaluations, definitions, key ideas, teacher strategies/methods, suggested student activities, sample assessments, and supplementary resources. The following competencies are addressed: explain the evolution of technology as a means through which needs and wants are satisfied; identify current and expected developments in technology for selected areas of life (including business management, communication, consumer services, education, entertainment, financial management, household operation, industrial production, law enforcement, recreation, and transportation); identify the positive and negative effects of technological developments on people; and determine the skills needed to adapt to technological advancement at work and home. Twenty-six supplements contain information and activity sheets on the following: what technologists and futurists say, current and expected developments, scanning, impact of technology on education, positive and negative effects, skills workers will need, creativity, and fastest growing occupations. Concluding the guide is a 19-item bibliography. (MN)

ED 388 837

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Understanding the Impact of New Technology on Life and Work

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PROJECT CONNECT SECONDARY GUIDE FOR CONSUMER & HOMEMAKING EDUCATION

Illinois State Board of Education
Department of Adult, Vocational and Technical Education
Carl D. Perkins Vocational and Applied Technology Education Act of 1990

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General Guidelines

The terms "teacher" and "student" are used throughout to describe the instructor and participants.

STRATEGIES (for teachers) and ACTIVITIES (for students) as stated in the guide are not always parallel to the numbering system.

Teachers need to carry out preassessment activities to determine level of student competency. Previous work or education experiences may be such that the teacher will choose not to do some of the competencies.

Key to Symbols – The following symbols are used throughout the guides to designate enhancement activities:

- related basic skills, giving particular attention to language arts and mathematics
- related decision-making and problem-solving skills, including the application and transferability of these skills to personal, family, and work responsibilities to be demonstrated
- enrichment activities according to student abilities and experiences
- interrelationship of concepts to personal, family, and work
- influence of technology on the subject matter, application of knowledge, and related work
- pre- and/or posttest assessment activities

Checklist for Users

Before addressing any of the competencies, the teacher should check in advance to see what materials or preparations are needed.

Competency #1 – Explain the evolution of technology as a means through which needs and wants are satisfied.

_____Gather the items listed in Method 1 and Method 5 and bring to class.

_____Use a world globe or an atlas for Method 3.

_____Collect pictures and articles from newspapers and magazines to make a bulletin board for Method 4.

_____Duplicate Supplement 1, "Impact of Technology on Your Life," for students to complete for Activity 2.

_____Duplicate Supplement 2, "Computers and Their Effect on Your Life," to use for Activity 3.

_____Prepare Supplements 3, "2020 Vision: What Technologists Say," and 4, "2020 Vision: What Futurists Say," as transparencies to aid discussion of what technologists and futurists say about the future and the year 2020 (Method 6).

_____Duplicate Supplement 5, "What Earth People are Saying," for students to use in Activity 4.

_____Duplicate Supplements 6, "Comparison Chart of Technology: Oldest," and 6A, "Comparison Chart of Technology: Newest," as handouts for students to compare technology in history to similar technology of today (Activity 5).

Competency #2 – Identify current and expected developments in technology for areas of agriculture, business management, communication, construction, consumer services, education, entertainment, financial management, health care, household operation, industrial production, law enforcement, recreation, and transportation.

_____Prepare Supplement 7, "Imagineering," as a bulletin board, poster idea, handout, or transparency to stimulate creative thinking about an Experimental City (Method 1).

_____Prepare Supplement 8, "Food for Zero-G," as a transparency to share future agricultural technology for Method 2.

_____Duplicate Supplement 9, "Scanning the Future," for a handout (Method 3).

_____Invite a resource person to show a personal computer that affects consumer services (e.g., banking, electronic mail, bookkeeping, budgeting, or tax preparation) for Method 4.

_____Make a transparency of Supplement 10, "Impact of Technology on Education," for discussion of new ideas about the future of education (Method 5).

_____Invite a financial officer to the class to discuss new technology in banking. See Method 6 for discussion topics.

_____Plan a field trip to a fitness, wellness, medical center/hospital, or nursing center in order to give students the opportunity to observe new technology used in health care (Method 7).

_____For Method 9, invite a resource person such as a doctor or nurse to demonstrate new products available that make health care easier for them and their patients. This may be a substitute if a field trip is not possible.

_____Duplicate Supplement 11, "A House Run by a Computer," as a transparency to stimulate thinking for Method 10.

_____Duplicate Supplement 12, "Sample Letter," for students to discuss effects of computer technology.

_____Furnish advertisements from catalogs, pamphlets, newspapers, or magazines for new exercise equipment (Method 11).

_____Plan a trip or invite a resource person to explain new building sites and the latest technology.

_____Supply poster board or construction paper for students to sketch their version of "My Experimental City" for Activity 11.

Competency #3 – Identify the positive and negative effects of technological developments on people.

_____Duplicate Supplement 13, "Positive and Negative Effects of Technology," for a handout. This supplement may be used as a pre- and/or posttest (Method 1).

_____Use Supplement 14, "Positive and Negative Effects of Technology on Individual Health," as a guide to discussion for Method 2.

_____Invite a resource person to share concerns of health hazards at different workplaces. See Method 4 for questions to ask.

_____Prepare articles from newspapers or magazines which represent scientific or technological items affecting the family or environment (e.g., oil spills) for Method 5.

_____Gather supplies such as a large beaker, cold water, blue food coloring, and a white sheet of paper to perform the demonstration in Method 6.

_____Duplicate Supplement 15, "What's My Responsibility?," for a handout for Method 8.

_____Prepare Supplement 16, "Help for Those Terrified of Technology," as a transparency to identify suggestions for students with a fear of technology.

_____Invite a human resource person to share the positive work and family benefits her/his company is providing for employees (Method 11).

_____Duplicate Supplement 17, "Evaluate Given Situations about Concerns with Medical Life Support," to use as a handout and discussion topic for Activity 1.

_____Duplicate Supplements 18, "Positive and Negative Impacts of Technology," and 19, "Impact of Technology on the Workplace," as handouts for Activities 3 and 4.

Competency #4 – Determine the skills needed to adapt to technological advancement at work and home.

_____Duplicate Supplement 20, "Skills Workers Will Need," as a handout or transparency for students to know which skills workers will need for future jobs (Method 5).

_____Duplicate Supplements 21, "A Creativity Profile," and 22, "Increasing Your Creativity," to test for creativity and to suggest ways to improve creativity (Method 7).

_____Have available an example of a recent news event taken from a newspaper or magazine that might have an impact on job trends (e.g., an election of a democratic President) for Activity 1.

_____Duplicate Supplement 23, "Determine Technology Needed To Solve Given Problems," for a handout to determine what technology is appropriate in the given situation (Activity 3).

_____Duplicate Supplement 24, "Help Wanted—21st Century Careers," for Activities 6 and 7.

_____Duplicate Supplement 25, "Fastest Growing Occupations Requiring a High School Diploma or Less Education," for a handout (Activity 8).

_____Duplicate Supplement 26, "Fastest Growing Occupations Requiring Some Postsecondary or Extensive Employer Training," for Activity 9.

Introduction

Most segments of human life are touched by technological growth.

Systems of technology impact directly and indirectly on the nature of society and the quality of life and living.

In earlier times, humankind had to know about and understand the natural environment in order to survive. Now, we must understand technological developments and what effects they have on human, social, and natural environments as well.

How well the present is managed will depend on how well all citizens understand the function of technological systems and their relation to human existence and purpose.

Explain the Evolution of Technology as a Means Through Which Needs and Wants Are Satisfied.

Student Outcomes

- Recognize the development of technology and its effects on people.
- Analyze the impact of technology on current and future life.
- Identify solutions to technological problems.
- Recognize that inventions satisfy needs and wants.

Definitions

technology	– the application of knowledge; the use of resources to meet human needs, to solve problems, and to extend human capabilities
family	– individuals joined by blood, marriage, adoption, or other bonds who share same support systems
invention	– the use of knowledge to select the best possible solution
change	– to cause to become different; to alter

Key Ideas

From the earliest times to the present, humans have sought to satisfy three basic needs: food, shelter, and clothing. The difference in satisfying basic needs from early times to the present is in the level of technology that is applied to satisfy those needs.

To fully appreciate the extent of today's knowledge, one must examine its evolution since the beginning of recorded history. Early man's development was based on previously known knowledge which in turn has led to how present man satisfies the needs and wants of today.

Each significant step in the development of technology had an effect on the evolution of yet another step. Inventions and products are examples of technology and are the means through which needs and wants are satisfied.

Teacher Strategies/Methods

1. Introduce Competency One by bringing in antique home devices such as rug beaters, noodle cutters, and farm tools. Have students guess what each device is; then discuss the need for the tool at the time. What has replaced the tool or why don't we need it anymore?

2. Ask students to use references to define technology. Discuss the definition in class and arrive at a consensus class definition. To illustrate the definition, have students contrast homes, businesses, and schools of today with those of ten and twenty years ago and identify some examples of technological change evident in these cases.

3. Ask students to collect newspaper or magazine articles dealing with new technologies. Examples are computers, compact disc players, bar code readers and scanners, videocassette recorders, satellites, and electronic banking. Key questions follow:

   - Does this technology enable you to have more time for other activities?
   - Does it require more or less manpower to handle situations?
   - Are tasks simplified or made more complex? If more complex, is the result of the task improved in proportion to the compexity?

4. It is important to discuss the concept of change. The following are some questions to ask:

   - Why do things change?
   - Why should things change? Why not?
   - Are we challenged or afraid of changes caused by technology?
   - What if time stood still and nothing new ever developed?

5. Discuss how the different cultures and people in the global environment have affected technology. Using a world globe, point out origins of consumer products such as coffee from Brazil. Technology has affected the manufacturing, assembly, and transportation of our consumer products. Ask students to list other products that can be identified with other cultures.

6. To develop interest, use a bulletin board titled "FYI" (for your information). Post pictures and articles found in newspapers and magazines depicting technology. Include future predictions and illustrations.

7. Bring a past and present invention to class (e.g., an old-fashioned telephone compared to a push-button phone). Discuss the impact of these on life and work, then and now. Discuss what needs and wants were satisfied by this invention.

8. Using Supplements 3, "2020 Vision: What Technologists Say," and 4, "2020 Vision: What Futurists Say" as transparencies, discuss with the students what technologists and futurists project. Ask if any evidence of these are seen as of 1995. Which are more believable? What could be added to the list for 2020?

Suggested Student Activities

1. Give examples of two ways technology today is like the technology of early humans. Give two ways in which it is different. For example, humans still need food, but we have more control over the source of food.

2. Complete the checklist in Supplement 1, "Impact of Technology on Your Life." Analyze what impact the devices or technology has on one's life now. Discuss how the future may be impacted. Discuss questions raised on the supplement.

3. List three situations in which a computer affects a student's life (e.g., class registration, bank accounts, grocery shopping). (See Supplement 2.)

4. Using Supplement 5, "What Earth People Are Saying," role play an outer space person. Brainstorm a list of comments earth people may be making about the future (e.g., we are afraid to eat food because of the additives and cancer causing agents; we just love getting our housework done in five minutes; we have a lot of leisure time).

5. Using Supplement 6 and 6A, "Comparison Chart of Technology," match the pictures of the oldest technology to the newest technology. (6 is the oldest technology and 6A is the newest technology.) Compare the technological advancement of today to earlier times and how technology has affected each of the students' lives (e.g., picture of bicycle could compare to the picture of the car).

6. Using brainstorming, interviewing, and observation techniques, identify technology problems people have at work, school, home, or in the community. Identify ten problems. An example could be the proper disposal of disposable diapers (which may be a community or environmental problem).

7. Working in groups, suggest some possible solutions to the problems listed in Activity 6. Discuss what would be needed to solve problems. Discuss what impact this solution (or invention) would have on satisfying people's needs and wants.

8. Sketch or identify an invention that would satisfy a need or a want and make one's life easier today. Discuss the problem first (don't like to clean the sink in the bathroom) and invent or identify a solution for that need (e.g., a self-cleaning sink).

Sample Assessments

Knowledge

1. Write three examples of new technological developments and devices and how they impact home economics or one's life.

2. Give an example of how technology is used to satisfy each of the three basic needs.

Application

Students will make an exhibit of an invention that has made their lives more pleasurable (8 tracks, cassettes, CDs).

Supplementary Resources

Textbooks/Books

Creative living: Basic concepts in home economics (4th ed.). (1990). (See Bibliography.)

Kiplinger, A., & Kiplinger, K. (1989). *America in the global '90's: The shape of the future—How you can profit from it.* Washington, DC: Kiplinger Books.

Life management. (1990). Englewood, NJ: Prentice Hall.

Life plans (2nd ed.). (1990). Cincinnati, OH: South-Western.

Articles

Center, J. (1990, January-February). Where America was a century ago. *The Futurist*, p 22.

Gordon, M. (1990, July-August). High-tech loneliness: How our inventions keep us apart. *The Futurist*, p. 60.

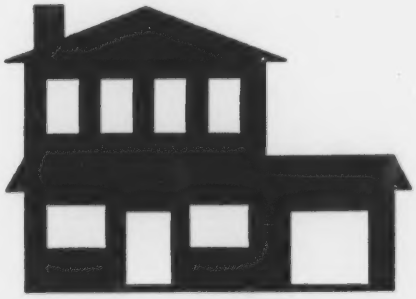
Videos

Risk, safety, and technology. (1988). This 19-minute video discusses risks created and solved by technology. Part of the *You, Me, and Technology* series available from Agency for Instructional Technology (AIT), Box A, Bloomington, IN 47402. (800) 457-4509 or (812) 339-2203.

SUPPLEMENT 1

Impact of Technology on Your Life

DIRECTIONS: Part A. Using the checklist below, check (✓) the technological devices you have for personal or family use. After completing Part A, continue with Part B.



____ air conditioner
____ automobile
____ cigarette lighter
____ calculator
____ car phone
____ compact disc (CD) player
____ digital clock or watch
____ dishwasher
____ electric can opener
____ electric coffee maker
____ electric hair curlers, curling iron
____ electric hair dryer
____ electric hand mixer
____ electric razor
____ electronic garage door opener
____ facsimile (fax) machine
____ microwave oven
____ personal computer
____ remote control devices
____ shower massage
____ smoke detector
____ stationary bicycle
____ stereo with tape recorder/player
____ television
____ telephone
____ telephone answering machine
____ trash compactor
____ treadmill exerciser
____ video camera (camcorder)
____ videocassette recorder (VCR)
____ video games
____ washer and dryer
____ water conservation devices (low flow toilet, faucet, shower)

Include additional examples on the line below.

_____

Part B: Now that you have considered some of the modern devices that technology has produced, imagine that they all have disappeared or you never had the convenience of owning any of the devices.

How would your daily routine and activities change?

Would your life be affected at all?

Which device would you miss the most?

Why?

If you could wish for any of the devices on the list in Part A, which would you like to have?

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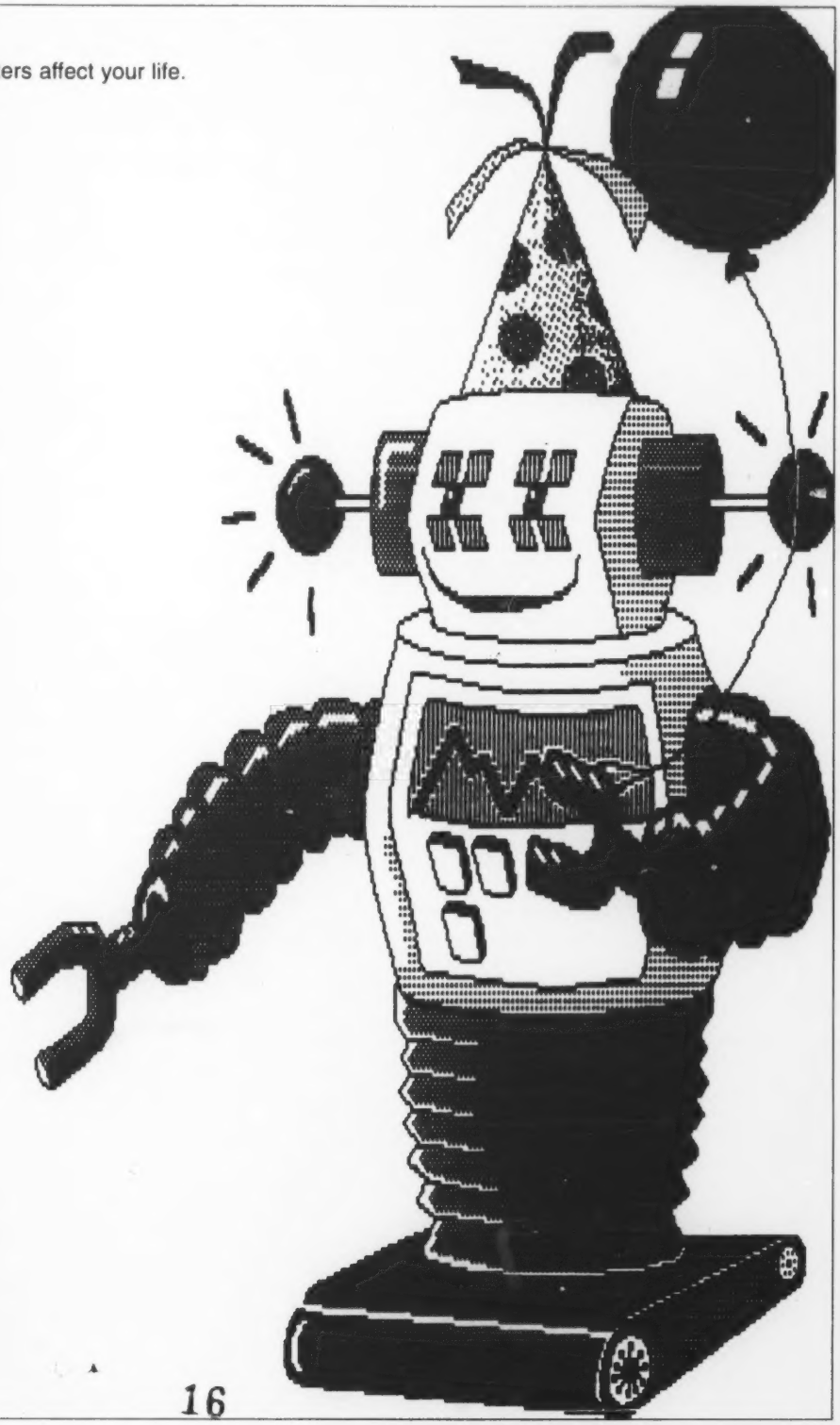
Source: *Impact of technology on the family* (pp. TF-9,10). (1992). Stillwater, OK: Mid-America Vocational Curriculum Consortium.

SUPPLEMENT 2

Computers and Their Effect on Your Life

List three situations when computers affect your life.

Example: Grocery Shopping



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SUPPLEMENT 3

2020 Vision: What Technologists Say

- Computers will be a powerful force and an integral part of everyday life, even in household tasks.
- People will have more time for creative pursuits.
- Relationships will become more and more vital for meeting emotional and social needs.
- People will have ready access to more knowledge than ever before imagined.
- Entertainment options will expand, using audio, video, and computer components.
- Telephone communications will be greatly improved.
- Robots will be used for manufacturing, construction, and exploration purposes.
- Supplies of usable natural resources will continue to grow more scarce and costly.
- New technologies will be developed for waste management and conservation of resources.

2020 Vision: What Futurists Say

- Personal and home management may become almost completely computerized. You may be able to program your refrigerator to serve a glass of chilled fruit juice for breakfast and your closet to clean your clothes automatically.

- Home decor may be programmed by computer and changed for special occasions or holidays.

- Work options will move toward entrepreneurial and intrapreneurial activity. Entrepreneurs will create their own businesses to respond to the needs of consumers. Intrapreneurs will develop their own ventures within the structure of a larger company or corporation.

- Microcomputers will revolutionize many forms of travel, including the automobile. This will lead to great reductions in highway accidents.

- Fashion consulting will be in demand with video cameras and computerized analysis.

- Global communication will be achieved through computer networking.

- Computers will be used for conducting interviews and making objective judgments.

SUPPLEMENT 5

What Earth People are Saying!

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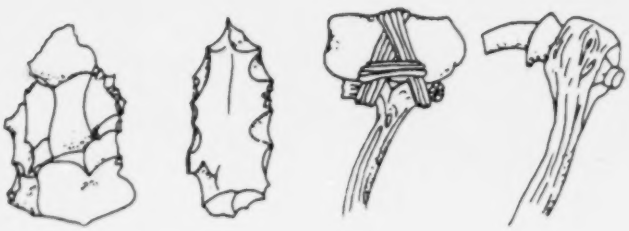
SUPPLEMENT 6

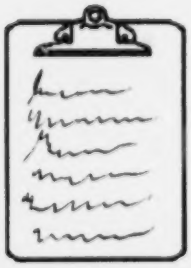
Comparison Chart of Technology: "Oldest"



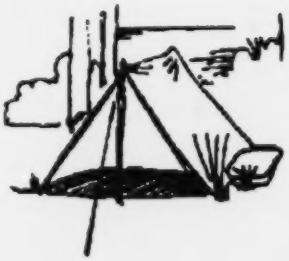
1. _____

2. _____

3. _____



4. _____



5. _____

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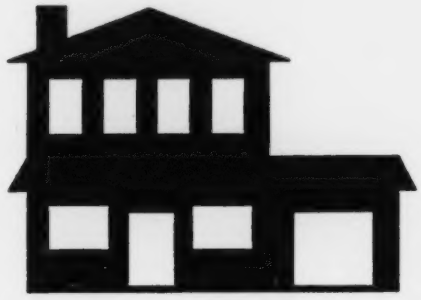
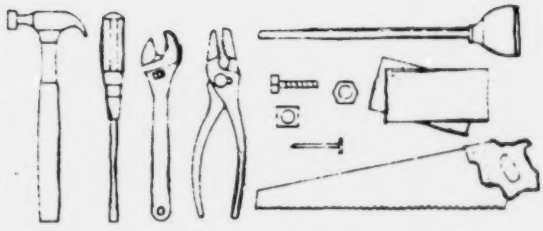
SUPPLEMENT 6A

Comparison Chart of Technology: "Newest"

A.



B.



C.

D.

E.

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COMPETENCY TWO

Identify Current and Expected Developments in Technology for Areas of Agriculture, Business Management, Communication, Construction, Consumer Services, Education, Entertainment, Financial Management, Health Care, Household Operation, Industrial Production, Law Enforcement, Recreation, and Transportation.

Student Outcomes

- Recognize the need and value of technological information and developments.
- Develop an awareness of how technology is currently impacting work, family, and the community.

Definitions

imagineering – to make believe and create

SMART house – innovative, fully automated housing venture of the National Association of Home Builders; many of the innovations promise to be housing standards of the future (*Impact of Technology*, p. T:F-116)

Key Ideas

For one to compete in the future, an understanding of new developments in technology is important. For example, technology places new demands on many employers in the workplace.

Current and expected developments in technology will impact all aspects of life—work, play, family, and government. People will need to be able to work and perform with the new technological developments.

Students need to recognize the current and expected developments in various areas of technology.

Note: If imagineering an Experimental City does not seem appropriate for students, activities could center on resources people, field trips, and brainstorming and research activities.

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Teacher Strategies/Methods

1. Introduce Competency Two by explaining to students that they are going to take an imagineering trip. Imagine yourself in your car on a highway heading toward the most Experimental City in the world, a city that has all the latest possibilities for urban living. As you come to a rise, you suddenly see it for the first time. Pull off to the side of the road, stop your car, and get out for a good look. The following activities will be related to what the student will see in this Experimental City that relates to the topics mentioned in the competency. Use Supplement 7, "Imagineering," as a bulletin board idea, poster idea, transparency, or handout to stimulate creative inventing.

2. Using Supplement 8, "Food for Zero-G," direct students to make a list of the agricultural developments mentioned in the interview with the space farmer (e.g., no imports from earth, feed 10,000 citizens on one farm, and so on). Suggest that the students decide which development the Experimental City will use to feed the population in the city. Ask the students if this technology would eliminate our farms.

3. Use Supplement 9, "Scanning the Future," as a transparency. Discuss how people will react when they realize that new purchases trigger more direct-mail promotions. Does this invade privacy?

4. Share with the students new technology that affects consumer services. Include new ideas such as the design of grocery shopping carts. A resource person might be invited to demonstrate how a personal computer can access a variety of goods and services (e.g., banking, electronic mail, bookkeeping, budgeting, and tax preparation). **A point to make:** Consumers have a wider use of technology to satisfy needs and wants.

5. Use Supplement 10, "Impact of Technology on Education," as a transparency. Discuss how technology allows education to operate efficiently. How has education changed since the students graduated from or left high school?

6. Invite a financial officer to speak to the class about new technology in banking. The discussion might include how long it takes to clear a check, and other aspects of banking affected by technology.

7. Suggest the "imagineer" visit a doctor's office in the Experimental City. Ask what processes were used in the care of the patient. Did a computer analyze, diagnose, and suggest proper care? Did a physician conduct the examination? Was a new product or machine used in the examination? Give examples of developments in the health care area such as computerized diagnosis (house calls) where symptoms are reported over the phone and diagnosed by a doctor or nurse.

8. Take a field trip to a fitness, wellness, medical center/hospital, or nursing center to observe new technology being used in health care.

9. Invite a local doctor or nurse to discuss new technology in health care and to demonstrate new products available that make health care easier for them and their patients (e.g., tamper-proof bottles for prescriptions, disposable gloves and syringes, digital thermometers, and other items they could easily bring to the classroom).

10. Have students brainstorm and list items in homes that represent new technology. Examples include VCRs, home security devices, digital thermometers, remote control television, mobile telephones, satellite dishes, computers, compact disks, and microwaves. Discuss how these items could improve management. For example, a microwave used for preparing food could be faster than the conventional oven and allow for more time for other activities. Have students consider what life would be like before these items were invented. Key questions include the following:

    - Was life simpler then or now?
    - In what ways was life different?

11. Using Supplement 11, "A House Run by a Computer," suggest that students write a letter to a friend about the new computer that runs their house. Suggest the students tell their friend about the positive (e.g., it gets me to work on time) and the negative (e.g., the clock got messed up and woke us up at 3:00 a.m.) aspects of their computer.

Supplement 12 can be used as a sample of a letter or can be read and examined for analysis of effects of computers.

12. Bring in catalogs, pamphlets, and newspapers or magazine advertisements for new exercise equipment (e.g., bicycles, trampolines, rowing machines, weightlifting equipment). Have students select the ones they think would be right for their needs now and later in life. The purpose is to make students more aware of improved technology.

    Follow this up with a discussion of how technology is affecting areas such as sports and outdoor activities.

13. Invite resource people to the classroom or take a field trip to sites where new technologies such as the following are being used:

    - a local architect to explain a computer-aided design system used to plan a house
    - a new house being built to observe the use of energy-efficient windows and doors
    - local houses using alternative energies for heating and electrical needs
    - local houses adapted to accommodate the special needs of residents
    - a SMART house that uses automated concepts (see Definitions)

Suggested Student Activities

1. Look at the Experimental City in Supplement 7, "Imagineering," and discuss what students *see* and *feel*. Is the city beautiful, ugly, dirty, clean, cold, or warm? Is it all paved, or does it have grass and trees?

2. Imagine what the *people* in the Experimental City are like. Are they young or old? Are there any children? Are people relaxing or working? What expressions do they have on their faces? Are there any people at all? Do they look like you do now?

3. Draw a picture of a future *house* that you would like to live in. (The Experimental City may have communities of houses developed underground, underwater, or in space.) If appropriate, have students construct a basic drawing of their new home and describe how they think living in the new house would be.

4. Determine how to *communicate* with the occupants of the Experimental City. Does everyone have a mobile phone on them or in transportation vehicles? Role play how one would communicate with a family member across the city.

5. Imagine what kind of *educational system* the Experimental City would have. Are there traditional schools, modified schools, year-round schools, or no schools at all . . . learning centers . . . community centers . . . stimulus studios . . . learning banks . . . interaction studios? (See Supplement 10, "Impact of Technology on Education.")

6. Discuss what people do for *entertainment* in the Experimental City. Are they listening to a universal sound system for the whole city? Are they individually involved in video games and robotic play? What types of music, movies, or literature are available to the citizens?

7. Envision a *financial establishment* in the Experimental City. Role play someone wanting to pay bills or to transfer money. Decide if they would use an automatic teller machine (ATM) or an Electronic Fund Transfer (EFT) that allows a customer to pay bills or transfer money between accounts. Would they use a credit card or their home computer to pay bills or transfer money?

8. Brainstorm what kind of *law enforcement* is present in the Experimental City. Does the city need law enforcement? Is there a "Robo Cop" that patrols the streets? What kind of correctional facilities exist?

9. Determine what people do for *recreation* in the Experimental City. Describe the forms of recreation, or how people are involved in leisure activity. Explain what kinds of sports or activities are being done. Do people go on vacation from the city, or do they vacation within the city? Devise a vacation plan for a single mother and two children ages 7 and 12.

10. While looking down on the Experimental City, discuss *transportation* vehicles that are being used by the citizens. Are there trains running on air? Are there boats and ships running through the city? Are airplanes landing inside the city? Is there space travel to and from the city? Are there cars and fuel available?

11. Develop a poster of the Experimental City by taking one new development from each of the listed areas and display a picture or sketching on a poster entitled "My Experimental City." Share with the class what the city of the future will be like.

Sample Assessments

Knowledge

1. Complete the written test (following page).

2. List ways the automated check-out system in business is beneficial to consumers and stores. (Some examples of benefits include shorter check-out lines, reduced prices, reduced errors by the cashier, time saved, labor saved, and more accurate inventories.)

3. List ten items commonly used in the home that are computerized. (Examples can be microwave ovens, dishwashers, washing machines, cars, garage openers, automatic setback thermostats, programmable hand-held calculators, and computerized games and devices.)

Application

1. Have students write and present skits or plays which illustrate an activity performed in the home (e.g., preparing a family budget, cleaning a bedroom, organizing family members' schedules each week). Following the presentations, ask the students to analyze each situation that was presented and decide if the activity could be done easier or more efficiently through new technology.

2. Ask the students to keep a log for one week. Have students write down each time they completed a task at home. Instruct them to record a star by those tasks that were completed through the use of a new technology. At the end of the week, have the students analyze the log and think of ways to improve tasks (without stars) by utilizing new technology.

3. Have students visit two grocery stores: one that is automated and one that is not. Have them evaluate the stores in terms of efficiency and management techniques. Have the students consider check-out lines, prices, cashier efficiency, and so forth. Ask students to write a brief report describing which store they preferred and why.

Written Test

Give at least one example of a new technological advancement in each of the areas listed below:

a. Agriculture _____

b. Business management _____

c. Communication _____

d. Construction _____

e. Consumer services _____

f. Education _____

g. Entertainment _____

h. Financial management _____

i. Health care _____

j. Household operation _____

k. Industrial production _____

l. Law enforcement _____

m. Recreation _____

n. Transportation _____

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Supplementary Resources

Articles

Gilmore, E. (1990, June). The integrated automated educated house. *Popular Science*, pp. 104-107.

Hunter, B. (1988, September). Food for thought: Convenience and flavor with risks. *Consumer's Research Magazine*, pp. 8-9.

Hunter, B. (1990, November). Food for thought: Edible packaging. *Consumer's Research Magazine*, pp. 8-9.

Mayer, C. E. (1990, October). Food of the future. *Consumer's Research Magazine*, pp. 27-29.

New products. (1990, April). *Apparel*, p. 82.

Pesanelli, D. (1990, March-April). Education takes into the streets. *The Futurist*, pp. 29-33.

Petrowski, E. M. (1991, April). New wave cooking. *Home Mechanix*, pp. 50-60.

Riche-Farnsworth, M. (1991, March). The future of the family. *American Demographics*, pp. 44-46.

Sills-Levy, E. (1991, April). U.S. food trends leading in the year 2000. *Food Technology*, pp. 128-132.

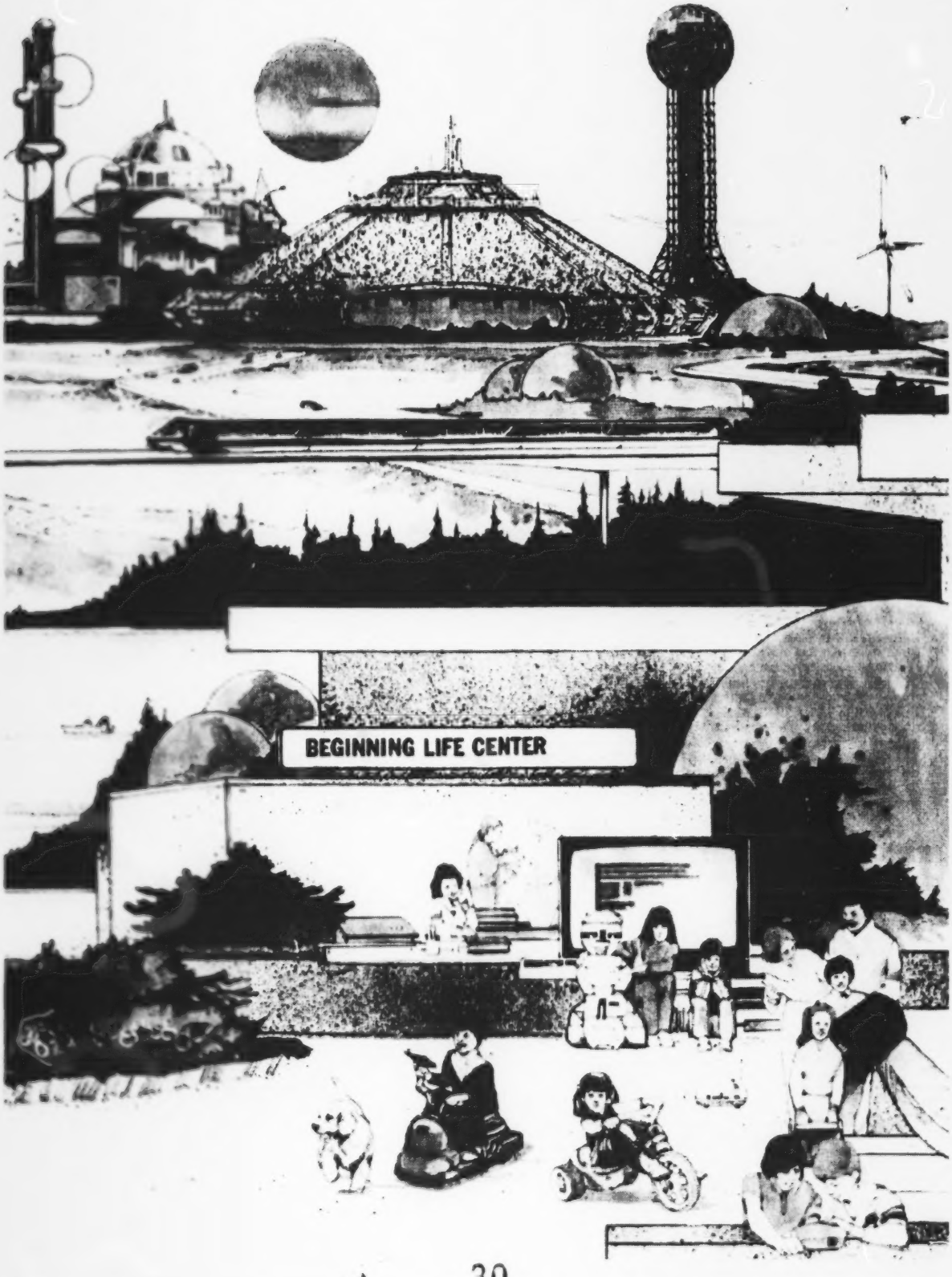
Specchio, J. J. (1991, May/June). The food supply of the future. *What's New in Home Economics*, pp. 20-22.

Wilford, J. (1990, June). Becoming Martians: Our next great adventure in space. *Popular Science*, pp. 100-103.

Imagineering . . .

Source: Glines, D. (1984, May). Imagineering . . . *J. C. Penney Forum*, p. 16.

29



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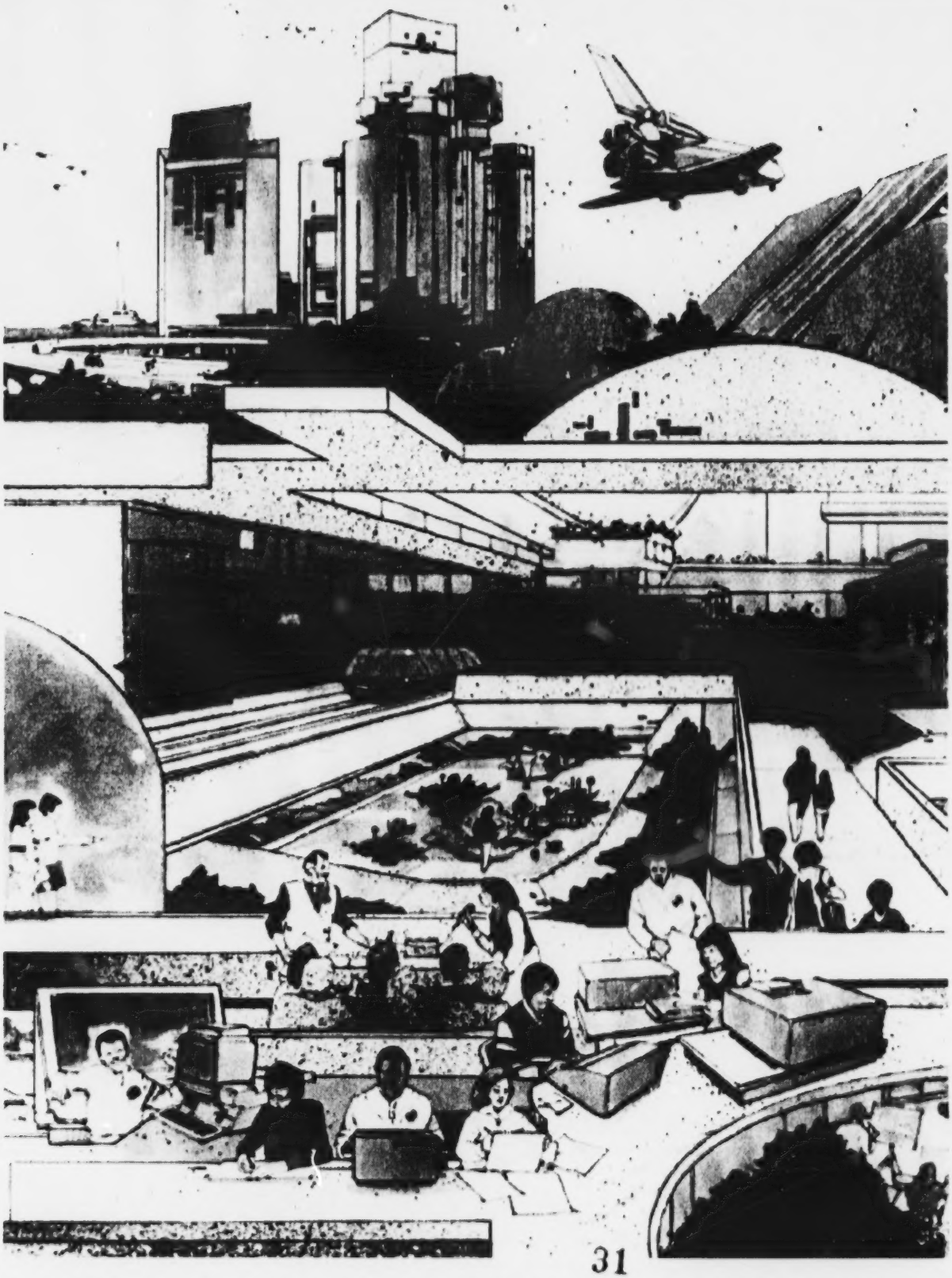

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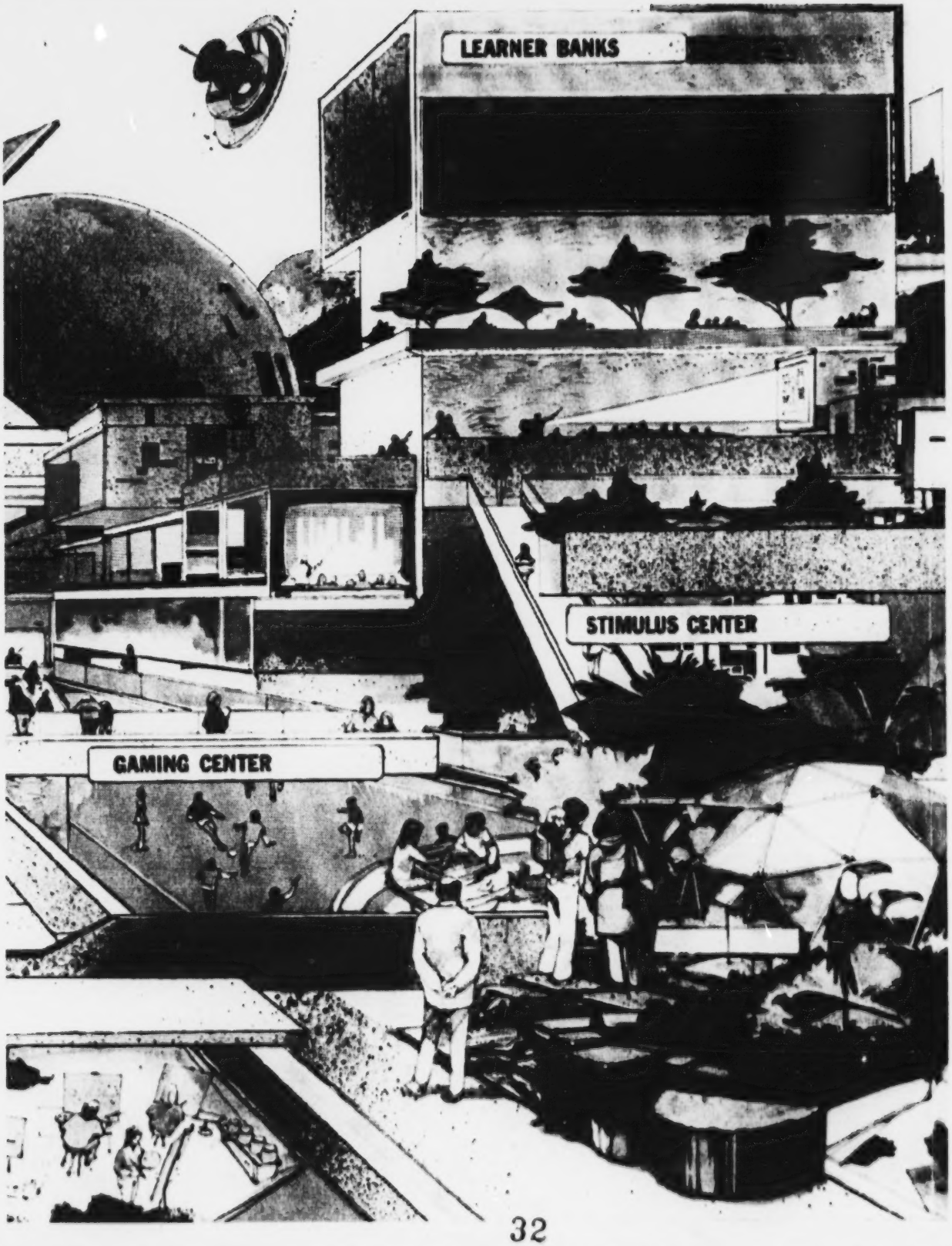

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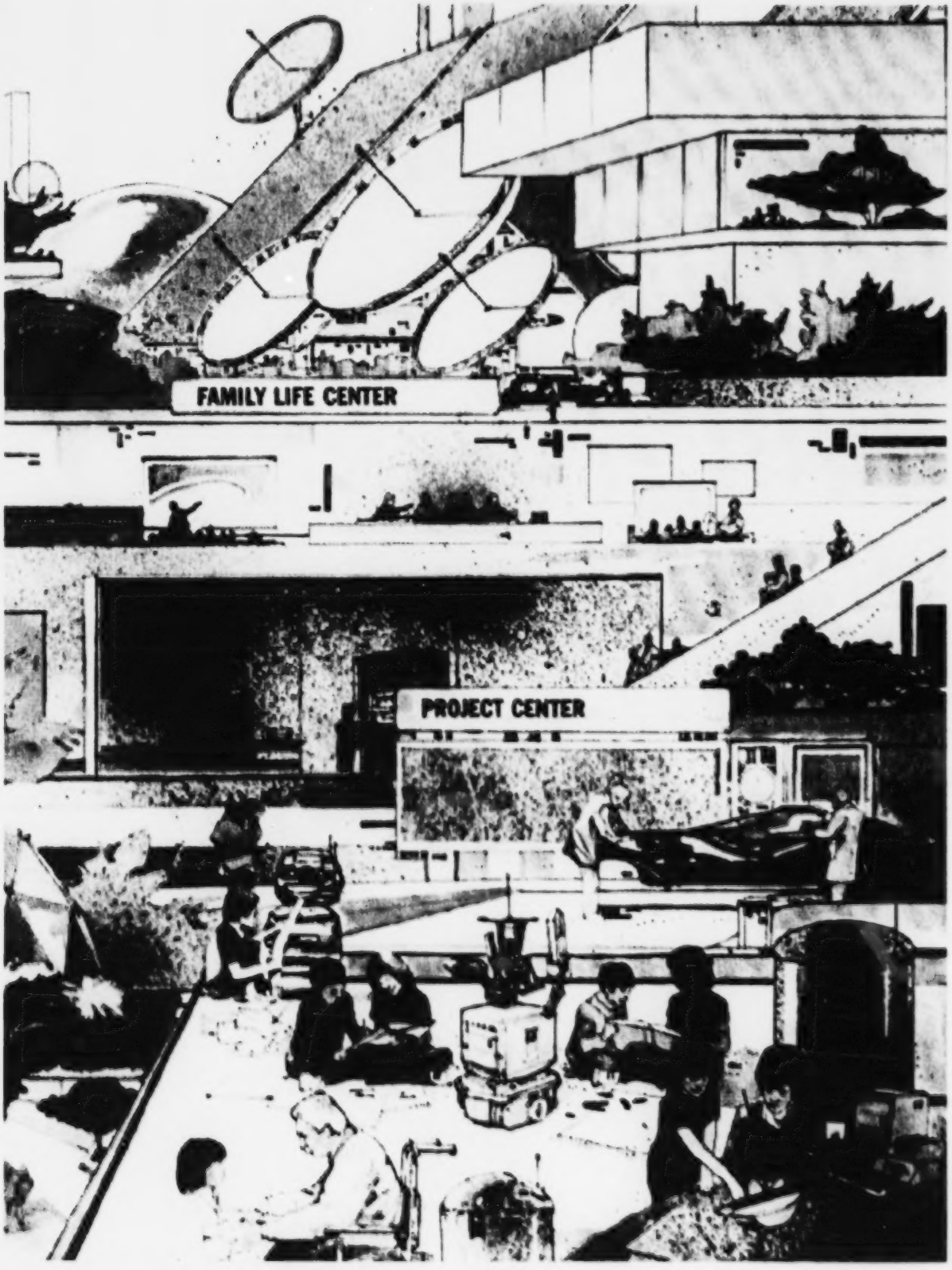
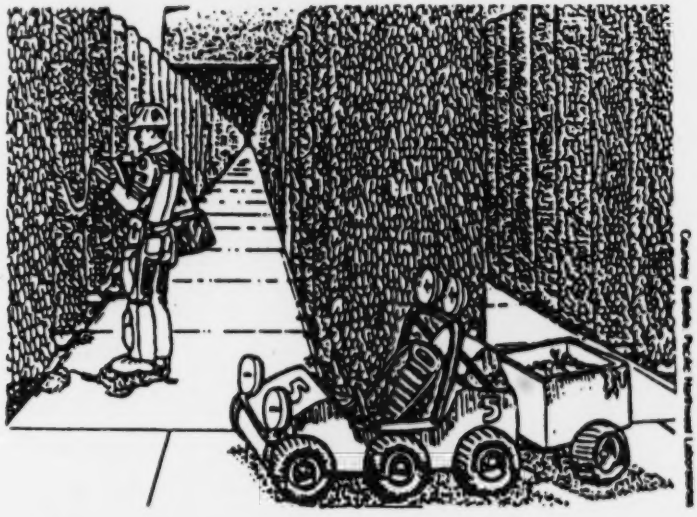

FAMILY LIFE CENTER
PROJECT CENTER

Food for Zero-G



Before long, some farmers will be growing food that is really out of this world! The drawing shows a worker checking one of the hydroponic growth systems inside a domed space farm.

Interview with a Space Farmer

Island One, January 16, 2012

On a recent tour through the Colonies of the United Universe, we stopped at Island One and talked with a farmer there:

Q: *At lunch today, the waiter told us that all the food on the menu was produced here on Island One. Do you import any food from Earth?*
A: No, it's too expensive. We raise every bit of food for all 10,000 of our citizens right here on this farm.

Q: *You must have a very large area under cultivation?*
A: Not really. We can grow all the food necessary to support one person in an area just 6½ ft. long and 6½ ft. wide. The entire farm takes up just 100 acres.

Q: *How can you raise so much food in such a small space?*
A: Well, for one thing, we raise most of our crops hydroponically—in water instead of soil. That saves a lot of space because we can grow plants on tall vertical frames. Also, our farm produces food continuously—one crop after another, all year-round. It's always summer here, and we don't have any cloudy days or storms to contend with.

Q: *Do you raise any animals?*
A: Yes, they help us recycle leftovers. We raise our cows and goats almost entirely on corn stalks, cucumber vines, and other crop wastes. Our chickens eat table scraps. Rabbits are our main source of meat. They take up less space than hogs or cows and they need only half as much feed to produce a pound of meat. We also raise fish in those ponds over there.

Q: *Where do you get the water for the fish ponds?*
A: All the water in the colony is used over and over again. Water for drinking and cooking comes from the farm's dehumidifiers, which pull moisture out of the air. Waste water is purified in a solar furnace and then piped back to the farm.

Q: *Have you had any crop failures?*
A: Not so far. When we started the farm, we inspected the shipments of plants and seeds from Earth very carefully to make sure they didn't contain any weeds or insects. Now our farm is pretty much pest-free.

Q: *Do you miss your farm back on Earth?*
A: Not a bit! I've even learned to like rabbitburgers!

Source: Taylor, P. (1982). *The kid's whole future catalog* (p. 76). New York: Random House

SUPPLEMENT 9

Scanning the Future

Welcome to the brave new world of the supermarket scanner, where the laser devices that tote up what's in your grocery cart will soon do a lot more than help control the store's inventory and generate detailed receipts for you. By drawing on computerized data from the scanners and the plastic you use at the checkout counter, marketers, manufacturers, and even nonprofit groups that want to get a message to you will soon be able to know your family's buying habits and brand preferences.

**HOW WILL PEOPLE REACT
WHEN THEY REALIZE
THAT WHAT THEY BUY
TRIGGERS A NEW FLOOD
OF DIRECT-MAIL PROMOTIONS?**

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Adapted from Mayer, M. (1990, October 15). Scanning the future. *Forbes*, pp. 114-117.

Impact of Technology on Education

Technology allows many aspects of education to be accomplished more efficiently.

- New technologically advanced equipment is used to make the physical conditions at schools more pleasant, to demonstrate occupational skills, and to help students with special needs.

Computers in Schools

Computers are used throughout education

- by students for math and reading drills, to take tests, and to design projects
- by teachers to write curriculum, to grade and record tests, and to design posters
- by administrators to keep financial records for the school, to maintain academic records for students, and to design newsletters or reports

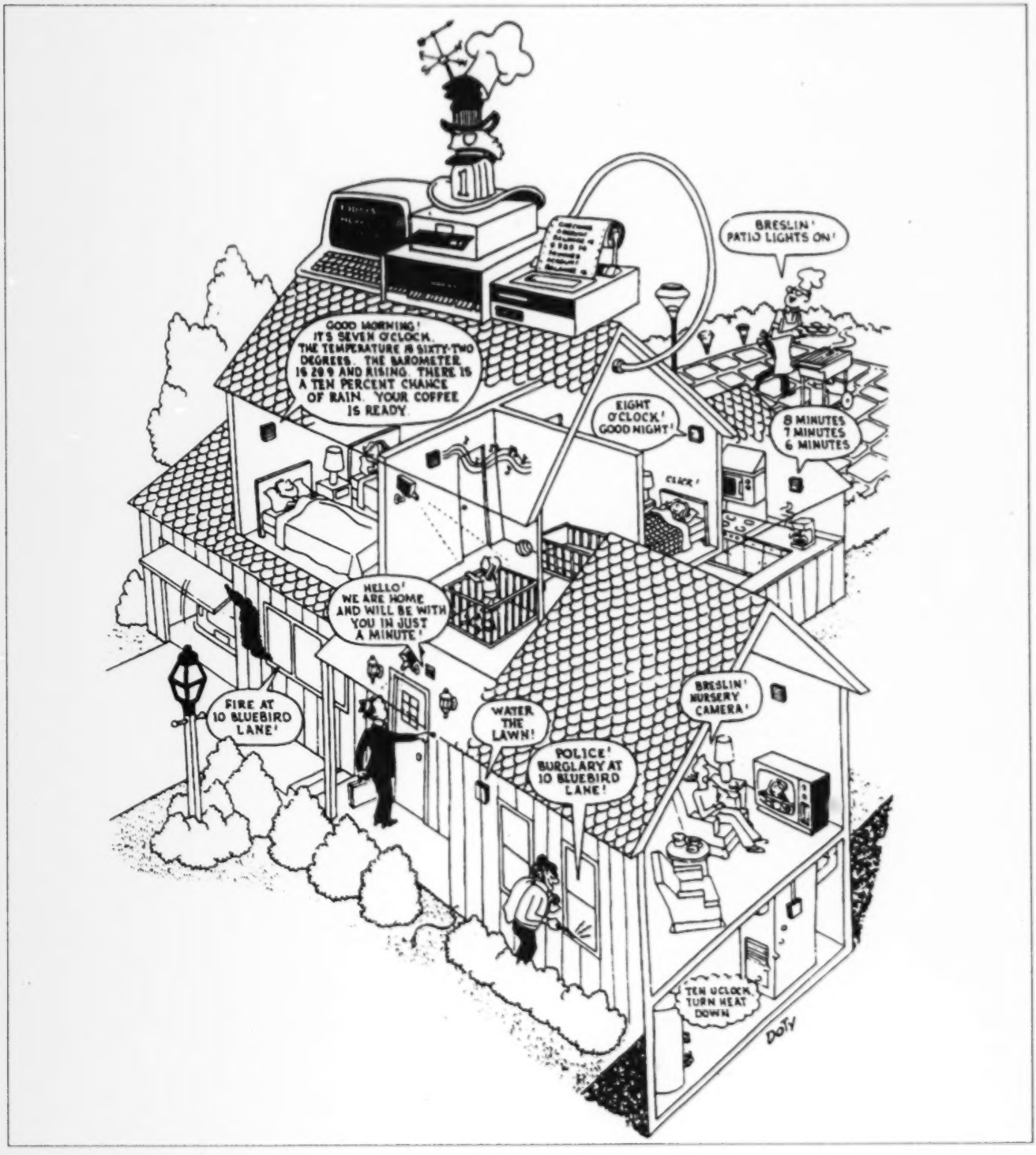
Technology helps to bring the world to the student.

- Satellites pick up signals from around the world and transmit them to education sites.
- Satellites allow talk-back television and teleconferencing to make special courses available to all schools (long-distance learning).
- Many extension classes can also be viewed on home television for homebound students or individuals interested in continuing their education at home.

Source: *Impact of technology on the family* (pp. T:F-24, 25). (1992). Stillwater, OK: Mid-America Vocational Curriculum Consortium.

SUPPLEMENT 11

A House Run by a Computer


GOOD MORNING! IT'S SEVEN O'CLOCK. THE TEMPERATURE IS SIXTY-TWO DEGREES. THE BAROMETER IS 29.9 AND RISING. THERE IS A TEN PERCENT CHANCE OF RAIN. YOUR COFFEE IS READY.
BRESLIN' PATIO LIGHTS ON!
EIGHT O'CLOCK! GOOD NIGHT!
CLICK!
8 MINUTES 7 MINUTES 6 MINUTES
HELLO! WE ARE HOME AND WILL BE WITH YOU IN JUST A MINUTE!
FIRE AT 10 BLUEBIRD LANE!
WATER THE LAWN!
POLICE! BURGLARY AT 10 BLUEBIRD LANE!
BRESLIN' NURSERY CAMERA!
TEN O'CLOCK. TURN HEAT DOWN.
DOTY

Source: Taylor, P. (1982). *The kid's whole future catalog* (p. 32). New York: Random House.

Sample Letter

Dear Shana,

We've had a lot of changes around here since you last heard from me. A couple of months ago, we got a new home computer. It's a lot different from the one we had before. Our old computer could play ping-pong and figure out my dad's bank balance and stuff like that, but this one actually TALKS to us. It's kind of spooky—almost like there's a person inside that little box. In fact, this computer seems so human we've even given him a name. We call him "Breslin."

Breslin keeps track of all kinds of things around the house. He tells my parents when the coffee is ready and reminds me to take the garbage out. He lets us know if the grass needs watering or if the baby's crying. Breslin can operate the dishwasher, the TV, and all of our other appliances through a remote-control system. If we want him to open the garage door or turn the lights off, we just give him an order through the intercom.

Breslin is on duty day and night. He constantly checks various sensors around the house to make sure everything's all right. If a fire started or if someone tried to break into the house, he would sound an alarm.

All night long, Breslin works on the jobs we've given him during the day—like paying bills or addressing invitations to our Halloween party. Sometimes he "talks" to other computers to find out the answers to questions we ask him. Once my brother Joey wanted to know the won-lost record of all the left-handed Yankee pitchers. Breslin called the computer at the New York Public Library and got the information for him in no time.

Every morning, about the time the sun comes up, Breslin turns off night lights around the house. In the winter, he also turns up the heat. Then he checks his orders for the day. The schedule he follows depends on the day of the week. On school days, he gets me up about 6:30. "Good morning," he says cheerily. "This is Breslin." Then he tells me the time, the temperature, and what the weather's like outside. He reminds me of any appointments that day, like a babysitting job or my piano lesson. Finally, he turns on my radio to my favorite station for music and the news.

Usually everything goes smoothly, but once in a while my family wishes we'd never heard of Breslin. One time his clock got mixed up and he woke us up at 3:00 in the morning. Another time we were all out in the backyard and my dad was cooking hamburgers on the grill. Dad asked Breslin to turn the patio lights on—but instead he locked us out of the house and set off the burglar alarm. You should have seen us trying to explain that one to the police!

Write soon,

Love, Ann

Source: Taylor, P. (1982). *The kid's whole future catalog* (p. 33). New York: Random House.

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Identify the Positive and Negative Effects of Technological Developments on People.

Student Outcomes

- Develop an awareness of responsibility associated with the use of technology.
- List positive and negative effects that technology can have on health, the environment, and family life.

Key Ideas

Advancing technology will affect people—in the short- and long-term, both positively and negatively, regardless of cultural level of technology or rate of change.

All people are affected by technology even when they have no choice as to their own involvement. Decisions made today about the development and use of technology in one country will very likely have an effect on other countries of the world. Although there are many short- and long-term benefits, there are also short- and long-term negative effects.

Technology has affected where jobs are located and how they are done. Some automation takes the place of semiskilled workers, and controls quality and quantity of inventory.

Most workplaces have some health hazards created by technology. Although technology devices or materials were used to make work easier or faster, they can also result in many new problems.

Definitions

biodegradable	– can be decomposed in the environment as a result of biological action. **Note:** products vary in the amount of time required to degrade, from a few weeks to thousands of years
cocooning	– a social occurrence where families stay close to the home and interact very little with their outside surroundings
life-support	– an artificial or natural system that provides items necessary for maintaining life or health systems
organ transplant	– the surgical replacement of a diseased or destroyed organ with a healthy one (such as kidney or liver)

Examples of potential health hazards in the workplace created by technology:

- Mental hazards—the need for increased productivity with technological equipment can result in worker stress, anxiety, depression, and stress-induced physical illnesses such as headaches.
- Equipment hazards—misuse or failure to use protective guards or gear can result in loss of sight, hearing, limb, or life.
- Material-handling hazards—improper lifting and moving of material can result in back or muscle injuries.
- Computer hazards—prolonged sitting, keyboarding, and viewing a computer screen can result in eye problems, carpal-tunnel syndrome (nerve damage in wrist), or low-level radiation exposure.
- "Sick" building hazards—poor air quality because of inadequate circulation and toxic fumes from building materials can result in many respiratory problems for workers in that building.
- Electromagnetic field (EMF) hazards—exposure to repeated or high levels of radio waves, X-rays, or infrared or ultraviolet light is possibly linked to a higher incidence of cancer.

Beneficial Effects of Technology

The benefits of technology can most easily be appreciated by comparing the standard of living today with that of the past. In 1900, the average life expectancy of people living in the United States was 47.3 years. By the year 2000, it is expected to approach 80. Advances in medical science have allowed a longer productive life.

Advances in agriculture have increased food production by providing larger equipment, new varieties of crops which resist disease, and new methods of processing raw materials.

Because of technology, there is time to enjoy many leisure activities and to engage in community and social work.

Communication systems have brought people of the world closer than they have ever been before.

Detrimental Effects of Technology

The impact of technology has affected social organization, values, and lifestyles. High unemployment, high living costs, and overcrowding of people in substandard housing are some urban problems. One of the far-reaching effects of technological change has been population mobility. When transportation technology developed to a point where nearly anyone could move anyplace at any time, the strong community and family tie structure started to break down.

Two pressing long-term problems (as a result of technology) are the application and disposal of toxic substances and radioactive material and the depletion of natural resources. Because many dangerous chemicals take years to break down to a harmless state, the chances of ingesting them through plants, meat, and other foods is great, if proper disposal procedures are not used.

Teacher Strategies/Methods

1. Using Supplement 13, "Positive and Negative Effects of Technology," have students complete the quiz. Discuss the responses. Use this as a pre- and/or posttest. ☑

2. Use Supplement 14, "Positive and Negative Effects of Technology on Individual Health," as a guide for discussion. Technology and health care prevent and control diseases, cure illnesses, save lives, and enhance or replace ailing body parts. Technology, on the other hand, creates ethical and legal problems in health care.

3. After discussing Supplement 14, ask students to discuss whether they think technology has had a positive or a negative impact on health care. Topics that can be included are life support, organ transplants, test-tube babies, and surrogate mothering.

4. Invite individuals involved in different occupations (e.g., print shop employees, office workers, construction workers, medical center employees) to determine what, if any, health hazards are involved in their jobs due to new technology.

   Resource persons might address the following questions: Are there any physical hazards at your workplace? Does your work require any preventive safety measures or equipment? Do you receive any special instructions on the use of your equipment? Do you feel that technology has been harmful to your health? See Key Ideas for a list of health hazards at work.

5. Provide newspaper or magazine articles that discuss scientific or technological advances affecting family life or the environment. Discuss whether these advances were positive or negative.

6. To help students become aware of how technology carries responsibility, conduct the following demonstration. Fill a large beaker with cold water and tell the students it represents clean water or air. Ask students what happens when a pollutant such as oil is added? Add several drops of blue food coloring to the water, hold a sheet of white paper behind the jar for ease of view, and observe food coloring spread out. Note how much time it takes for the coloring to spread through the water. Point out that pollutants in water and air may, first, be in only one place, but they spread rapidly. Ask students to respond to the question, "What is our responsibility regarding pollution of our resources?"

7. Consider an environmental clean-up day or a class project to help needed areas in the community or school district. If a project is done, ask students to take pictures of their involvement and report to the class.

8. Distribute Supplement 15, "What's My Responsibility?" Generate classroom discussion by asking students to read and respond to the situations. Ask if the situations would affect students and what their responsibility would be in dealing with science and technology.

9. Share Supplement 16, "Help for Those Terrified of Technology," with the students. Discuss the definition of "technophobia" and suggestions for overcoming the fear of technology. Ask students to brainstorm other ideas to add to the list.

10. Ask students to list ways the present use of resources and decisions about technology may affect the quality of life for their children. For discussion purposes, use examples of current controversies such as tree cutting, car pollutants, or depletion of the ozone layer.

11. Invite a human resource manager from an area company to talk to the class about how new technology has affected the workplace and influenced employee benefits. The resource person may discuss benefits and programs the company offers such as a childcare center close to the site or an exercise program.

Suggested Student Activities

1. Read the case studies in Supplement 17, "Evaluate Given Situations about Concerns with Medical Life Support," and decide who will remain on life-support systems. (This activity can help students see how difficult the decisions about life support can be and how technology can affect lives.)

2. Trace family trees to great-grandparents' time. Noting the dates of birth and death, determine if there is a difference in life expectancy between that generation and the present generation. Discuss whether there are differences in lifestyles from one generation to the next. Does the student think that technology has improved lifestyles which, in turn, affects living a longer life?

3. Using Supplement 18, "Positive and Negative Impacts of Technology," choose one positive and one negative impact and discuss with the class what impact it has had on her/his family (e.g., employers have become more aware and responsive to employees' needs in attracting and retaining workers. This has affected my family by allowing me to have a flexible schedule so I can take my daughter to school and pick her up).

4. Using Supplement 19, "Impact of Technology on the Workplace," list work and family benefits that employers are providing.

5. Interview a company representative about company policies concerning the environment. Ask questions about recycling, waste disposal, and pollutants. Ask employer(s) what the company is doing to promote a positive outlook for future generations.

Sample Assessments

Knowledge

1. Define "biodegradable" and give an example.

2. Define "cocooning" and give an example.

3. Define "technology" and give an example.

Application

1. Survey your community to identify health-environmental hazards. (Could also be done at home.)

2. Divide into groups and analyze the information presented in the following case study to determine the role of technology in family issues:

   Case: Angela is a new mother and plans to set up her office at home by telecommuting via computer until her child is old enough for public school.

- What new stresses can Angela expect?
- How can technological devices help Angela's situation?
- Do you think Angela's quality of life will be better or worse? Explain.

Supplementary Resources

Articles

DiChristina, M. (1991, March). Home newsfront. *Popular Science*, p. 71.

Gibbs, N. (1991, March). How America has run out of time. *Time*, pp. 58-67.

Labich, K. (1991, May 20). Can your career hurt your kids? *Fortune*, pp. 38-50.

Pesanelli, D. (1990, March-April). Education takes to the streets. *The Futurist*, pp. 29-33.

Riche-Farnsworth, M. (1991, March). The future of the family. *American Demographics*, p. 71.

Videos

You, me, and technology: Health and technologies. Available from AIT, Box A, Bloomington, IN 47402. (800) 457-4509 or (812) 339-2203.

You, me, and technology: Health and technologies. A series of twelve 20-minute videos plus a 30-minute teacher's program and teacher's guide. The videos illustrate the impact of technologies on society and the effects of social decisions on these technologies. Available from AIT, Box A, Bloomington, IN 47402. (800) 457-4509 or (812) 339-2203. Purchase price: $150.00 for each title.

Pamphlet

SMART House. (1993). Available from National Association of Home Builders, 400 Prince George's Boulevard, Upper Marlboro, MD 20772-8731. (301) 249-4400. Purchase price: Free.

SUPPLEMENT 13

Positive and Negative Effects of Technology

DIRECTIONS: Distinguish between the positive and negative aspects of technology by writing "P" or "N" on the blank before each statement.

____ A. New products are produced more efficiently.

____ B. Many people feel a loss of privacy and feel less secure.

____ C. Many new products have increased costs.

____ D. Information can be accessed much faster.

____ E. Families are cocooning, which leads to less interaction.

____ F. More information and training will be needed to use each new device.

____ G. Environmental problems from excess wastes that are not biodegradable are increasing.

____ H. Communication is easier and more mobile.

____ I. Transportation continues to improve and be more energy-efficient.

____ J. Newer products will need to be replaced rather than repaired.

Source: *Impact of technology on the family* (p. T.F-120). (1992). Stillwater, OK: Mid-America Vocational Curriculum Consortium.

SUPPLEMENT 14

Positive and Negative Effects of Technology on Individual Health

Positive

1. Promotes healthy living
2. Helps individuals cope with change/stress
3. Increases life expectancy
4. Provides more career opportunities in development, testing, research, and evaluation of technology
5. Improves medical procedures (laser surgery, x-ray, and so on)
6. Develops new pharmaceutical products (drugs)
7. Allows individuals to live at home instead of in medical institutions

Negative

1. Results in higher costs because of more drug options, more treatments, higher insurance rates, and newer facilities and equipment
2. May create more complications or side effects arising from new drugs and treatments
3. Creates environmental problems with contaminated medical wastes and throw-away packaging
4. Creates legal and ethical dilemmas (life-support systems, organ transplants)
5. May result in increased stress related to newer advancements requiring greater productivity, more decisions about options available, and more education needed to stay informed

Source: *Impact of technology on the family* (pp. T.F-60, 61). (1992). Stillwater, OK: Mid-America Vocational Curriculum Consortium.

What's My Responsibility?

Burger King, McDonald's, and Wendy's have all announced that they are cooking their french fries in 100% vegetable oil. No more 90+% artery-clogging beef fat. No more fries with more saturated fat than hamburger. How does this decision affect their image? Will it affect you?

The noise level has risen steadily in the twentieth century, increasing both stress and hearing loss in individuals. Experts report that loud music already is causing permanent damage to the hearing of many young people. What jobs might expose you to high levels of noise?

Adapted from Illinois State Board of Education. (1992). *Illinois plan for home economics education exploration/onentation curriculum guide* (p. SA-15). Macomb, IL: Curriculum Publications Clearinghouse.

Help for Those Terrified of Technology

TECHNOPHOBIA: Anxiety experienced by a person when confronted with an object or situation involving technology.

- Educate yourself. Take classes, call the manufacturer's helpline, ask questions of your technologically endowed friends. The more you know the less you have to fear.
- Learn only what you need to. If a product has features you don't need, don't bother learning about them.
- Rely on other people.
- Join a support group.
- Realize you have the option of doing it the old way.
- Don't insist on control. Let your spouse, children, or coworkers be responsible for operating the machine and fixing it if it breaks.
- Ask for help. Experts say your confusion is most likely the result of overly complex product design, not inadequacy on your part.
- Turn it OFF. Try later when the frustration is gone.

SUPPLEMENT 17

Evaluate Given Situations about Concerns with Medical Life Support

The medical community deals with life and death situations every day. When dealing with whether or not to use life-support systems, there is often a conflict between the medical staff, the legal system, the family, and the patient. This supplement will help you see how difficult the decisions about life support can be.

DIRECTIONS: After reading the situations below, decide who will remain on life-support systems. Indicate your decisions by circling "yes" or "no". State your rationale of how you made that decision. Be prepared to discuss your decisions with the group.

Yes No 1. A 5-year-old girl has taken an overdose of drugs obtained from a tamper-proof container. The child has been in a coma for eight weeks and is being fed intravenously (by IV bottle). Doctors are not sure if or when the child will regain consciousness.

Rationale for decision:

Yes No 2. A 58-year-old woman has suffered from emphysema for many years. She is back in the hospital and is unconscious because of the lack of oxygen to her brain. Her lungs can no longer do their job, so she is on an artificial respirator.

Rationale for decision:

Yes No 3. A 16-year-old boy was involved in an automobile accident two days ago. He has multiple injuries with the most serious being the head injury. He is unconscious and is being fed intravenously. The latest tests show very little brain activity.

Rationale for decision:

DIRECTIONS: Answer the following questions in the blanks provided.

1. Who should make these decisions regarding life support?

2. Has technology improved the quality of life or simply prolonged it? Why?

Source: *Impact of technology on the family* (pp. T:F-67-69). (1992). Stillwater, OK: Mid-America Vocational Curriculum Consortium.

Positive and Negative Impacts of Technology

Impact on Families

Positive

1. There is a greater variety of services available for home use (e.g., food delivery, electronic entertainment, shopping networks, electronic mail).
2. New products are produced more efficiently (e.g., computer-aided design, computer integrated manufacturing, robotics).
3. Information can be accessed much faster (e.g., facsimile machines, pagers, educational satellite programs, personal computers with subscription utilities).
4. Communication is easier and more mobile (e.g., portable phones, cellular car phones, pagers, personal computers, facsimile machines).
5. Transportation continues to improve and be more energy-efficient (e.g., vehicles are designed with improved aerodynamics; aluminum and plastics are replacing heavier steel parts; artificial intelligence programs produce "brainy cars" that almost drive themselves; more vehicles use alternative energies).
6. Individuals with physical disabilities have increased mobility and improved performance of tasks (e.g., electric wheelchairs, communication through electronic devices, computers especially designed to assist with various disabilities).
7. Home health care made available through medical advancements is less expensive than hospitalization or nursing care facilities and allows for an improved quality of life for the elderly or disabled person.
8. Telecommuting allows work-at-home opportunities.
9. Employers have become more aware and responsive to employees' needs in order to attract and retain workers.
10. Using technology at home makes adjustments to the workplace easier.
11. Technology responds to the needs of more personal choices, freedom, and security.
12. Persons with disabilities can achieve greater independence.

Negative

1. "Cocooning" leads to decreased physical activity and less interaction with friends, neighbors, and extended family members.
2. More training and information will be needed to use or service the many new devices.
3. Newer products will need to be replaced rather than repaired resulting in increased costs and more discarded items.
4. Environmental problems from excess wastes that are not biodegradable are increasing.
5. New technology that was designed to assist the consumer also allows others to track your purchases and know about your personal life. Many people feel a loss of privacy and are less secure knowing that others can also access information about them (e.g., computerized bank accounts, computerized medical records, home shopping use of credit card numbers).
6. Many products and procedures used by technology can cause health problems for family members (e.g., respiratory problems from smog, joint injuries from repetitive motion while operating machinery, cancer from water contaminated by toxic waste).
7. As technology increases in leisure life, communication tends to decrease.
8. Medical advances now available so individuals can remain at home may burden the time and expenses of family members who care for an ill, disabled, or elderly person in the home. Also, daily invasion of privacy occurs by care providers.
9. Retraining due to employment changes may leave the family's head-of-household unemployed.
10. Job mobility may lessen family support.

Impact on Child Development

Positive

1. Increased competence of children using computers and machines.
2. More innovative child development products, toys, and equipment.
3. Increased awareness of the world by children because of more exposure through the media.
4. More opportunities for problem-solving games and tutoring through the use of computers.
5. Later ages for marrying. Couples are marrying and having children later when they are more financially and emotionally prepared for parenting. This is an indirect effect of technology.

Negative

1. Less human interaction. Studies show less one-to-one contact between people, including coworkers, partners, and parents and children.
2. Stress occurs when technology systems that we depend on break down.
3. Stress also occurs when one feels she/he does not have enough time to accomplish work or leisure activities.
4. There is also increased stress from trying to stay up-to-date on new technological inventions and breakthroughs.
5. Less physical activity because technology encourages spectatorship over participation. "Couch potatoes" watch television for hours at a time.
6. Many technology products are designed to make work easier and less physically demanding (e.g., instead of pulling open the garage door, we now push a button to open it).
7. Less uniqueness; more products are mass produced, resulting in more look-alikes.

Source: *Impact of technology on the family* (pp. TF-7, 8, 41-43). (1992). Stillwater, OK: Mid-America Vocational Curriculum Consortium.

SUPPLEMENT 19

Impact of Technology on the Workplace

Note: Increasing numbers of companies, including small companies, are adopting work and family benefits to attract and keep highly qualified workers, especially a growing number of women.

Job Shift

1. The types of jobs available change with new technology.
2. There has been a decrease in the number of manufacturing jobs.
3. There has been an increase in information processing and service jobs in areas such as finance, insurance, real estate, child and elder care, medical care, public utilities, and transportation.

Adult Retraining

1. The need for manual labor has declined with the technological automation of industry and robots.
2. This shift in the workforce emphasizes the need for advanced and continuing education, training, and retraining.
3. Adults can expect to change jobs several times in their working life.

Work Schedules

1. Part-time positions allow for more free time, more time at home with children, and seasonal workloads for industry.
2. Flextime gives employees the freedom to set their own working hours within a given framework. Examples: 8-4; 7-3; a 4-day week (10 hours each day); or a 5-day week (8 hours each day).
3. Shared jobs allow two people to share the hours and duties of one full-time job.

Company-Provided Child Care

On-site or nearby child care allows working parents to be closer to their children. Childcare expense may be partially or totally covered by the company as an employee benefit.

Source: *Impact of technology on the family* (pp. T:F-23, 24). (1992). Stillwater, OK: Mid-America Vocational Curriculum Consortium.

Determine the Skills Needed to Adapt to Technological Advancement at Work and Home.

Student Outcomes

- Develop an awareness of job trends and skills needed to adapt to technological advancement.
- Identify employability skills needed to become marketable in the technological jobs of the future.
- Develop a list of jobs and the skills needed for the jobs.

Definitions

high-technology	–	state-of-the art technologies being used to increase productivity in manufacturing, communication, transportation, agriculture, mining, energy, and commercial purposes, and to improve the provision of health care
transferable skills	–	abilities that can be used in many different jobs
career clusters	–	groups of jobs that require similar abilities and skills
learning to learn	–	ability to move into training and learn
problem solving	–	ability to identify, define, and analyze problems
technological literacy	–	knowledge of scientific and mathematical concepts

Key Ideas

Technology has had an effect on many occupations. Some jobs are lost through technological changes and other jobs are created.

A workplace dominated by technology places new demands on many employees. Employers want workers who are good at solving problems, who can invent ways to do work better or faster, who are good with math, who can communicate well with others, who have a good background in science, and who have good work habits.

A broader range of skills are needed to provide for greater job security and to increase mobility within the labor market.

Transferable skills include the abilities to organize one's time, to work with people, and to express oneself well. People with transferable skills have a great advantage when changing jobs.

Some automation is aimed not at taking the place of manual labor but at controlling quality and keeping track of inventory. Automation has replaced human labor mainly in jobs that involved semiskilled tasks.

Population increases might mean that there will be more jobs for teachers; for people who provide police protection and electric power; and for companies that make and sell toys, children's clothes, and appliances. As more people live longer, more jobs working with the elderly will become available.

The need for manual labor has declined with the technological automation of industry and robots. This shift in the workforce emphasizes the need for advanced and continuing education, training, and retraining.

Teacher Strategies/Methods

1. Ask students if they have seen science fiction movies, television shows, or read any books or comic books that are set in the future. (*Star Trek* might be an example.) If so, what was the vision of the future that was presented? What types of jobs were shown? Explain that decisions being made now are shaping the future for students. Emphasize that students can ensure better futures by finding out more about job trends and social changes.

2. Suggest that students start a media watch to keep track of new developments in job trends, *high* technology, and business responses to social changes such as changing roles of women and the growth of single-parent families. Students could be encouraged to collect newspaper and magazine articles and pictures and to take notes on radio and TV news broadcasts. Encourage students to read and watch business news to prepare themselves for a rapidly changing job market.

3. Write "The Changing Nature of Work" on chalkboard or a poster chart. Give students ten minutes to work in small groups listing ways they think jobs will change during their lifetime. Ask each group to share one way that would be the most likely to come true and one way that would be the most imaginative.

4. Encourage volunteers to discuss someone they know who has changed jobs in the middle of a career. Discuss why she/he made the change and how satisfied the person felt. An alternate activity might be to interview someone.

5. Use Supplement 20, "Skills Workers Will Need," as a transparency. Discuss characteristics employers might think important.

6. Ask how many students have used computers. Determine where they were used (i.e., school, home, other). What did they use them for? How long have they been using them? How has life been affected by computers? List how computers affect their lives daily (e.g., grocery shopping labels, computerized banking, some cars). Ask students to brainstorm situations where computer skills could help them in their job or home. Stress the importance of basic computer skills for future jobs and daily living. It is estimated 50% of future jobs will require computer technology of some type.

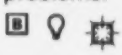
7. Supplement 22, "Increasing Your Creativity," can be shared with the students after they have completed Supplement 21, "A Creativity Profile," and Activity 2. Ask students how they can better prepare for the technological changes of the future.

Suggested Student Activities

1. Given the question, "What recent news events do you think might have an impact on job trends?," write several sentences to answer the question (e.g., environmental crisis, natural disasters such as floods or earthquakes).

2. Creativity is the power to bring something new or useful into existence. Complete Supplement 21, "A Creativity Profile," and discover whether the students have a mixture of both creative and uncreative qualities. (See Supplement 21 instructions.)

3. Problem solving is a human skill that will be important in solving technological problems. Read the case studies in Supplement 23, "Determine Technology Needed To Solve Given Problems," and solve problems presented. Determine what technology is appropriate in each situation. Discuss how technology can be used to solve problems.



4. Brainstorm and compare skills performed in previous jobs to the jobs they now hold. Were any of these skills transferred to their new jobs? (Transferable skills are skills that can be used in many different types of jobs.)

5. Imagine that it is the year 2010. Write imaginary diary entries describing a day at work in a job of the future. Include new inventions to be used on the job, the role of women in the workforce, the way workdays are scheduled, the amount of stress created by changes in working conditions, and the kinds of education and training people need for the jobs of the future. Volunteers can read their diary entries to the class.

6. In the future, some kinds of work will no longer be available. However, new opportunities will open up for teachers, law enforcement, child and elderly care, and home health care. Write a help wanted ad for a job that might be available in 2010. After sharing job ideas, complete Activity 7 using Supplement 24, "Help Wanted—21st Century Careers."

7. Using Supplement 24, study the cartoon characters and try to identify which applicant is trying to get the job listed in the classified ad. Discuss what skills each applicant must have to qualify for that particular job. Be creative and imaginative by listing new 21st century careers.

8. Using Supplement 25, "Fastest Growing Occupations Requiring a High School Diploma or Less Education," review the list of occupations and identify three job titles that students could apply for in the next year. Discuss what skills they have now and what other skills will be needed to get and keep the job.

9. Using Supplement 26, "Fastest Growing Occupations Requiring Some Postsecondary or Extensive Employer Training," review the list of occupations requiring training beyond high school. Research or discuss which occupations students have skills for and determine other skills needed.

Sample Assessment

Knowledge

1. Name at least three job trends that employees can expect in the year 2000.

2. List six employability skills that will be needed to be marketable in the technological jobs of the future.

Application

From a help wanted ad, select a career and determine what skills will be needed for the job. Then hypothesize for a year in the future (such as 2010) what a help wanted ad might look like and what skills would be required.

Supplementary Resources

Books

Shelley, K. J. (1992, Summer). More college graduates may be chasing fewer jobs. *Occupational Outlook Quarterly,* pp. 5-11.

Tomorrow's jobs. (1992-1993). *Occupational outlook handbook.* Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics.

What work requires of schools: A SCANS report for America 2000. (1991, June). Washington, DC: U.S. Government Printing Office.

SUPPLEMENT 20

Skills Workers Will Need

Basic Skills: Reads, writes, performs mathematical operations, listens, and speaks.

A. *Reading*—Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.

B. *Writing*—Communicates thoughts, ideas, information, and messages in writing; creates documents such as letters, directives, manuals, reports, graphs, and flow charts.

C. *Arithmetic/Mathematics*—Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.

D. *Listening*—Receives, attends to, interprets, and responds to verbal messages and other cues.

E. *Speaking*—Organizes ideas and communicates orally.

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons.

A. *Creative Thinking*—Generates new ideas.

B. *Decision Making*—Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.

C. *Problem Solving*—Recognizes problems; devises and implements plan of action.

D. *Seeing Things in the Mind's Eye*—Organizes and processes symbols, pictures, graphs, objects, and other information.

E. *Knowing How To Learn*—Uses efficient learning techniques to acquire and apply new knowledge and skills.

F. *Reasoning*—Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, integrity, and honesty.

A. *Responsibility*—Exerts a high level of effort and perseveres toward goal attainment.

B. *Self-Esteem*—Believes in own self-worth and maintains a positive view of self.

C. *Sociability*—Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.

D. *Self-Management*—Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.

E. *Integrity/Honesty*—Chooses ethical course of action.

Resource Management: Identifies, organizes, plans, and allocates resources.

A. *Time*—Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.

B. *Money*—Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.

C. *Material and Facilities*—Acquires, stores, allocates, and uses materials or space efficiently.

D. *Human Resources*—Assesses skills and distributes work accordingly, evaluates performance, and provides feedback.

Interpersonal: Works with others.

A. *Participates as Member of a Team*—Contributes to group effort.

B. *Teaches Others New Skills*—Negotiates with others to solve problems or reach decisions.

C. *Exercises Leadership*—Communicates ideas to justify position; persuades and convinces others.

E. *Negotiates*—Works toward agreements.

F. *Works with Diversity*—Works well with women and men from diverse backgrounds.

Information: Acquires and uses information.

A. *Acquires and Evaluates Information*—Identifies, assimilates, and integrates information from diverse sources.

B. *Organizes and Maintains Information*—Prepares, maintains, and interprets quantitative and qualitative records.

C. *Interprets and Communicates Information*—Converts information from one form to another and is comfortable conveying information orally and in writing.

D. *Uses Computers To Process Information*—Understands operations of equipment.

Technology: Works with a variety of technologies.

A. *Selects Technology*—Chooses procedures, tools, or equipment including computers and related technologies.

B. *Applies Technology to Task*—Understands overall intent and proper procedures for setup and operation of equipment.

C. *Maintains and Troubleshoots Equipment*—Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Adapted from *Occupational Outlook Quarterly* (1993, Fall). Office of Employment Projections, Bureau of Labor Statistics, U.S. Department of Labor, 2 Massachusetts Avenue, NE, Washington, DC 20212-0001.

SUPPLEMENT 21

A Creativity Profile

DIRECTIONS: Most people have a mixture of both creative and uncreative qualities. For each item below, decide if you are closer to the uncreative or creative factor. Then circle the number that best describes you.

	UNCREATIVE						CREATIVE
Desire to give and serve	1	2	3	4	5	6	7
Enthusiastic	1	2	3	4	5	6	7
Confidence in self and others	1	2	3	4	5	6	7
Calm, relaxed, alert	1	2	3	4	5	6	7
Sensitive, aware	1	2	3	4	5	6	7
Open-minded	1	2	3	4	5	6	7
Curious, looks for better ways	1	2	3	4	5	6	7
Often thinks imaginatively	1	2	3	4	5	6	7
Willing to experiment	1	2	3	4	5	6	7
Enjoys life, smiles, and laughs	1	2	3	4	5	6	7
Uses good judgment	1	2	3	4	5	6	7
Uses time well	1	2	3	4	5	6	7
Takes care of health	1	2	3	4	5	6	7

SUPPLEMENT 22

Increasing Your Creativity

Try one of these suggestions to increase your creativity.

- Take something you value and give it to someone who will appreciate it.
- Exercise in the fresh air.
- Visit a friend who has lots of positive energy.
- List seven things you can do well and review your list at least three times during the next 24 hours.
- Think about what it would be like to live without war or crime.
- Picture a very difficult situation and see yourself handling it calmly.
- Think about the positive aspects of your life.
- Spend time becoming friends with a person from a different background.
- Without spending extra money, give yourself three new experiences.
- Read a book about a very creative person.
- Look at an item near you (a stapler, a zipper) and try to figure out exactly how it works.
- Do one of your regular activities in a different way (e.g., go to work a new way).
- Experiment with some of the items you normally throw away and see what you can make.
- Find something that you really like in the next three people you meet.
- Think about a problem situation and find something good in it.
- Think of how each moment of life goes by so quickly and therefore is special.
- Go out of your way to help others experience a little joy.
- Practice saying what is on your mind, but do so with kindness.
- Consider how you use your time and then pick out two things you would like to stop doing.
- Design a personal exercise plan and guidelines for healthier eating.
- Think of something that you want to do but have been putting off, and do it before the day is over.
- Look at a single object (flower, leaf, pencil) and concentrate on it for three minutes.
- Make excellence a habit by always doing your best.
- Practice staying happy.
- Do something that will better organize the area in which you work.
- Change something in your environment to make it more positive.

SUPPLEMENT 23

Determine Technology Needed To Solve Given Problems

One of the goals of technology is to solve problems. However, humans must make decisions about what type of technology is appropriate in each situation.

DIRECTIONS: Determine how technology is needed to solve the following problems based on your own awareness of technology. Read each of the following case studies and, in writing, determine how technology can be used to help solve the individual or family problem.

Case A: Mr. & Mrs. Gregory, an elderly couple, return home to a dark house after an evening of playing bingo at the senior citizen center. The potential for burglary exists within their neighborhood. How can technology help this couple?

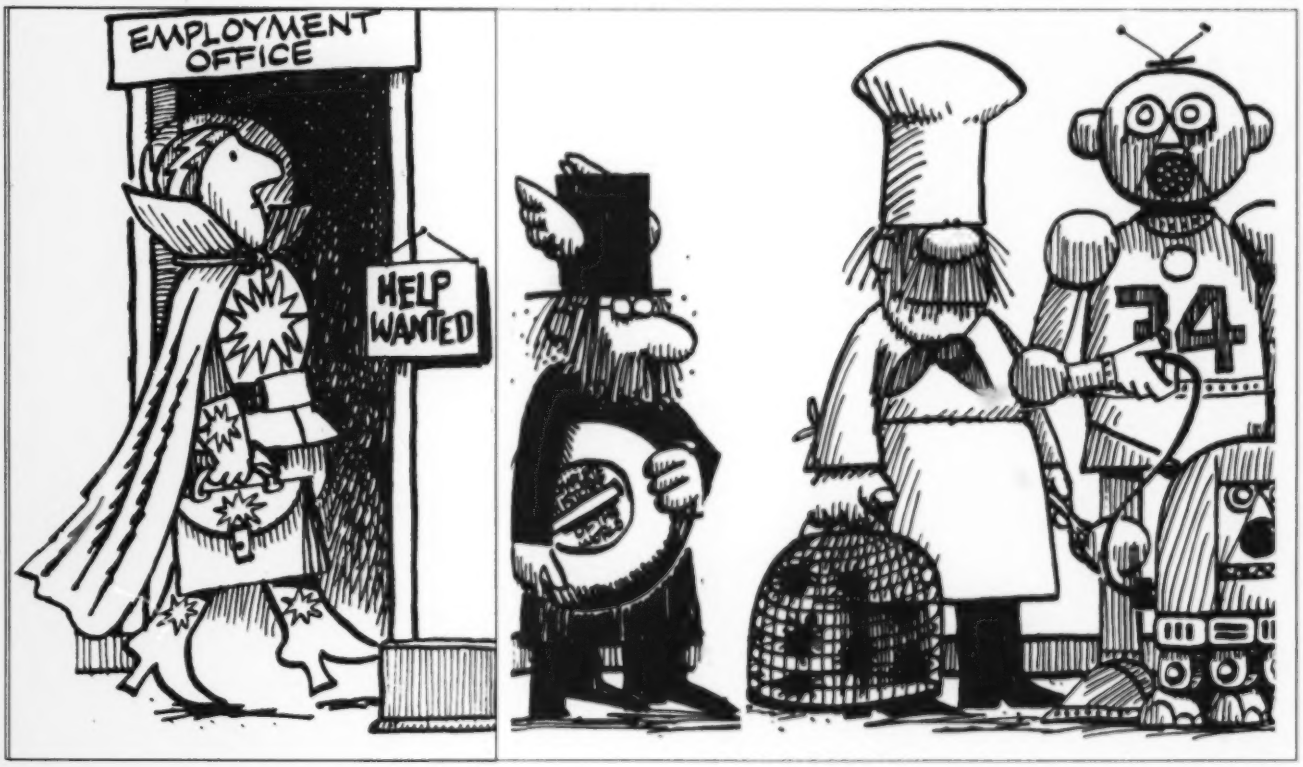
Case B: Andrea, a sixteen-year-old high school student, is having difficulty finding enough time to study and frequently "forgets" to complete her homework. How can technology help her with this problem?

Case C: David and Maria are the young parents of baby Lee. Lee has breathing problems including asthma and an allergy to mold spores. David and Maria are fearful their baby will stop breathing. How can technology help solve their problem?

Source: *Impact of technology on the family* (pp. T.F-11, 12). (1992). Stillwater, OK: Mid-America Vocational Curriculum Consortium.

SUPPLEMENT 24

Help Wanted—21st Century Careers



ROBOT RELATIONS. Interviewer needed to design or match personal robots to the needs and desires of human customers. Four years experience with robots, psychology degree, and high-level communication skills necessary. Your own personal robot included. Inquire MECHAN PALS, INC., 5K2-1B8-NV2

CHEFS needed for space hotel. Must specialize in insect cookery. Top salary, plus time-in-space bonus pay. Free transportation to and from Earth. Zip your résumé to Earth Headquarters. SPACE-OUT INNS, J207-1P26V

ACTORS/ACTRESSES. Be a star among the stars! Sing and dance on stages throughout the galaxy! The UP AND AWAY THEATER has bookings at Moon Base II and all the major space colonies. Zip your videotape to Minerva White, Director, 46X8N06

HISTORY RESEARCH POSITION AVAILABLE. Are you interested in what written communication was like back in the 20th century? Extensive computer work involved. Weekly reassignment, flex hours, and personally tailored workload. Zip your résumé to WHATWAS CORP., 4V19-D458S

Adapted from Taylor, P. (1982). *The kid's whole future catalog* (pp. 198, 199). New York: Random House.

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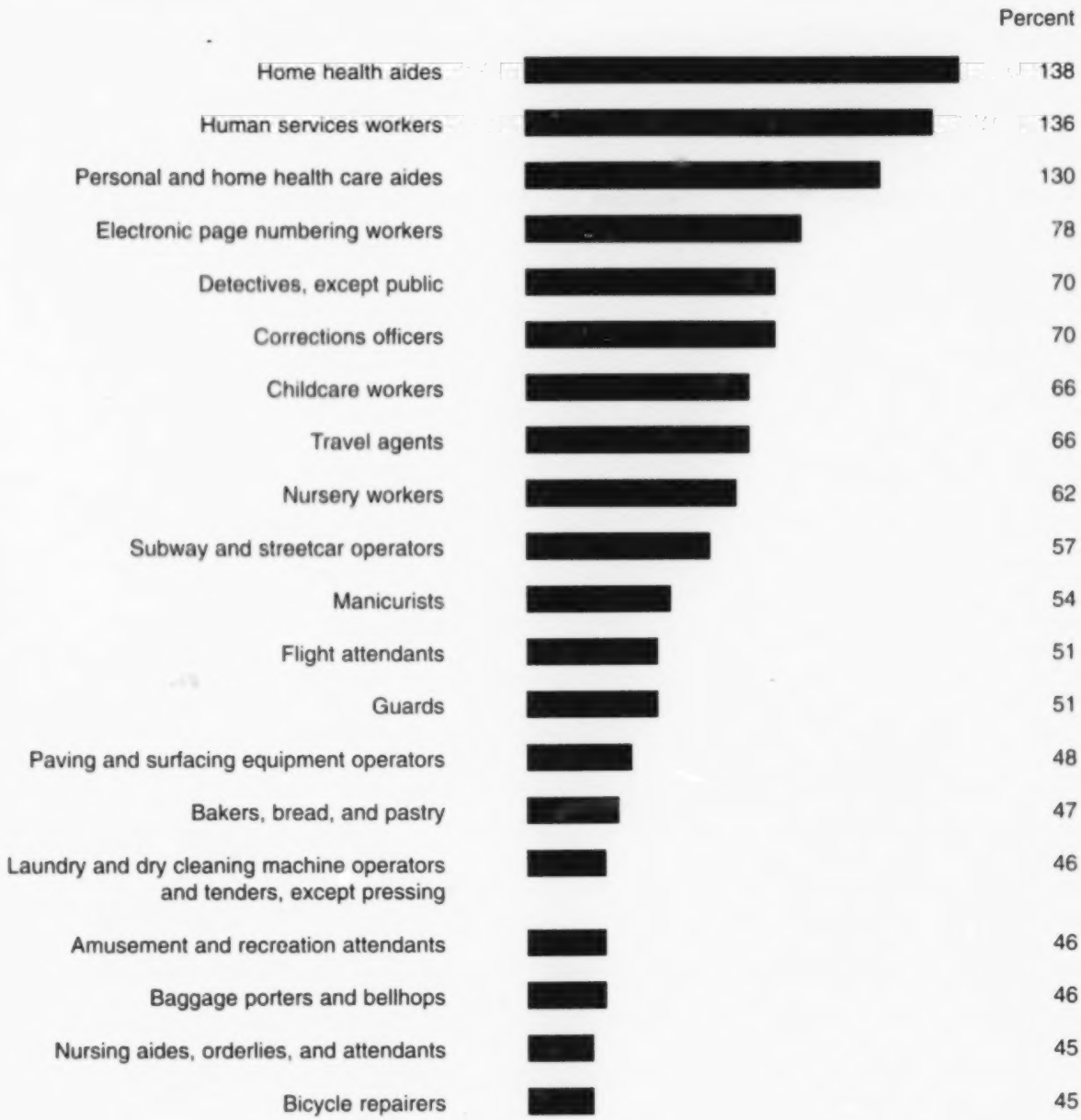
SUPPLEMENT 25

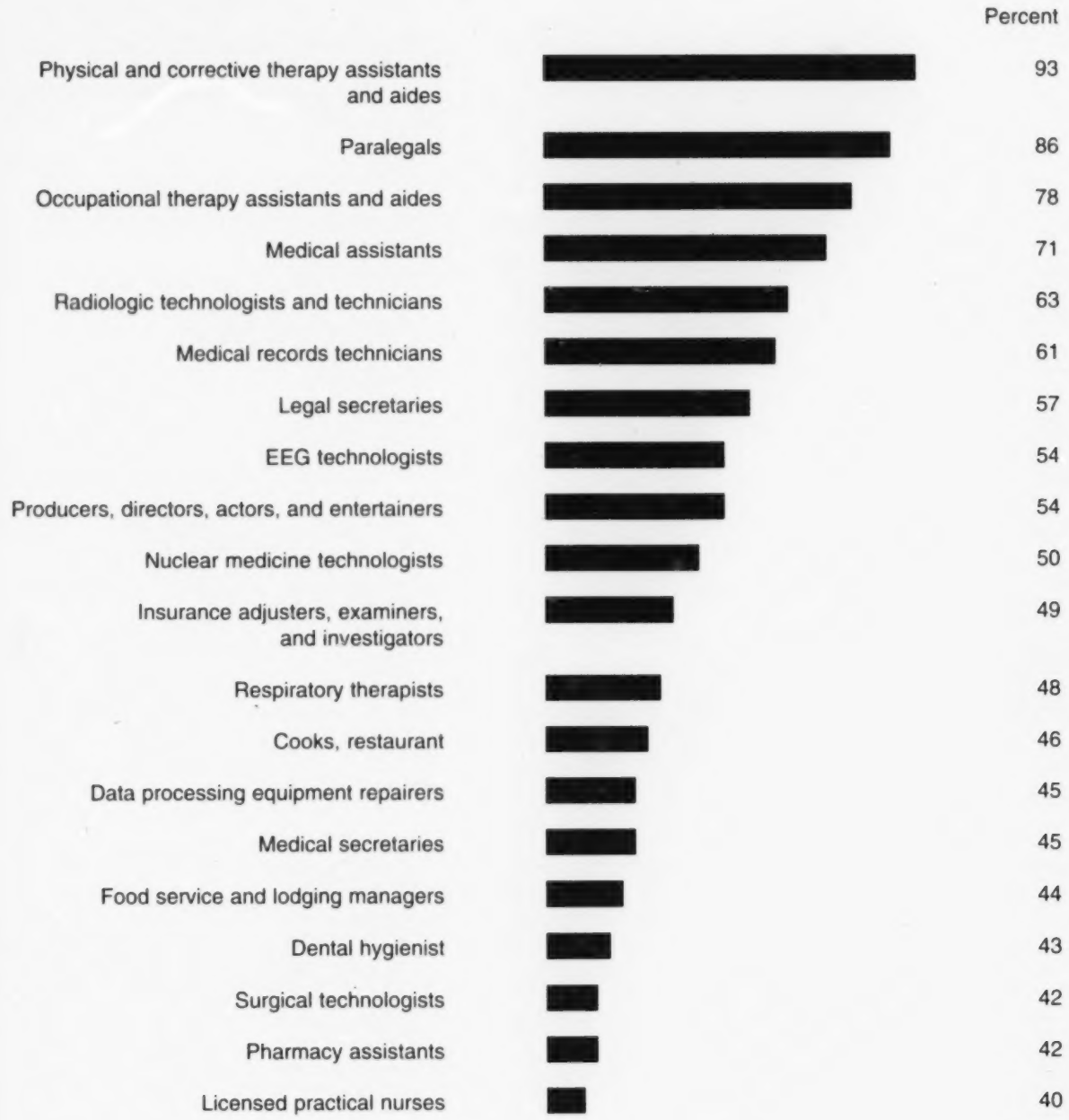
Fastest Growing Occupations Requiring a High School Diploma or Less Education


Percent
Home health aides 138
Human services workers 136
Personal and home health care aides 130
Electronic page numbering workers 78
Detectives, except public 70
Corrections officers 70
Childcare workers 66
Travel agents 66
Nursery workers 62
Subway and streetcar operators 57
Manicurists 54
Flight attendants 51
Guards 51
Paving and surfacing equipment operators 48
Bakers, bread, and pastry 47
Laundry and dry cleaning machine operators and tenders, except pressing 46
Amusement and recreation attendants 46
Baggage porters and bellhops 46
Nursing aides, orderlies, and attendants 45
Bicycle repairers 45

Source: *Occupational Outlook Quarterly.* (1993, Fall). Office of Employment Projections, Bureau of Labor Statistics, U.S. Department of Labor, 2 Massachusetts Avenue, NE, Washington, DC 20212-0001.

SUPPLEMENT 26

Fastest Growing Occupations Requiring Some Postsecondary or Extensive Employer Training



Source: *Occupational Outlook Quarterly.* (1993, Fall). Office of Employment Projections, Bureau of Labor Statistics, U.S. Department of Labor, 2 Massachusetts Avenue, NE, Washington, DC 20212-0001.

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What's new in equipment for the home economics professional. (1990, March-April). *What's New in Home Economics*, pp. 25-26.

Understanding the Impact of New Technology on Life and Work – Notes

WORLD-CLASS EDUCATION FOR THE 21ST CENTURY: THE CHALLENGE AND THE VISION

VISION STATEMENT

As we approach the 21st century, there is broad-based agreement that the education we provide for our children will determine America's future role in the community of nations, the character of our society, and the quality of our individual lives. Thus, education has become the most important responsibility of our nation and our state, with an imperative for bold new directions and renewed commitments.

To meet the global challenges this responsibility presents, the State of Illinois will provide the leadership necessary to guarantee access to a system of high-quality public education. This system will develop in all students the knowledge, understanding, skills and attitudes that will enable all residents to lead productive and fulfilling lives in a complex and changing society. All students will be provided appropriate and adequate opportunities to learn to:

- communicate with words, numbers, visual images, symbols and sounds;
- think analytically and creatively, and be able to solve problems to meet personal, social and academic needs;
- develop physical and emotional well-being;
- contribute as citizens in local, state, national and global communities;
- work independently and cooperatively in groups;
- understand and appreciate the diversity of our world and the interdependence of its peoples;
- contribute to the economic well being of society; and
- continue to learn throughout their lives.

MISSION STATEMENT

The State Board of Education believes that the current educational system is not meeting the needs of the people of Illinois. Substantial change is needed to fulfill this responsibility. The State Board of Education will provide the leadership necessary to begin this process of change by committing to the following goals.

ILLINOIS GOALS

1. Each Illinois public school student will exhibit mastery of the learner outcomes defined in the State Goals for Learning, demonstrate the ability to solve problems and perform tasks requiring higher-order thinking skills, and be prepared to succeed in our diverse society and the global work force.

2. All people of Illinois will be literate, lifelong learners who are knowledgeable about the rights and responsibilities of citizenship and able to contribute to the social and economic well-being of our diverse, global society.

3. All Illinois public school students will be served by an education delivery system which focuses on student outcomes; promotes maximum flexibility for shared decision making at the local level; and has an accountability process which includes rewards, interventions and assistance for schools.

4. All Illinois public school students will have access to schools and classrooms with highly qualified and effective professionals who ensure that students achieve high levels of learning.

5. All Illinois public school students will attend schools which effectively use technology as a resource to support student learning and improve operational efficiency.

6. All Illinois public school students will attend schools which actively develop the support, involvement and commitment of their community by the establishment of partnerships and/or linkages to ensure the success of all students.

7. Every Illinois public school student will attend a school that is supported by an adequate, equitable, stable and predictable system of finance.

8. Each child in Illinois will receive the support services necessary to enter the public school system ready to learn and progress successfully through school. The public school system will serve as a leader in collaborative efforts among private and public agencies so that comprehensive and coordinated health, human and social services reach children and their families.

Developed by citizens of Illinois through a process supported by the Governor, the Illinois State Board of Education and the Illinois Business Roundtable. Adopted as a centerpiece for school improvement efforts.

Printed by the Authority of the State of Illinois

ILLINOIS STATE BOARD OF EDUCATION
100 North First Street, Springfield, Illinois 62777-0001

Michael W. Skarr, *Chairperson, Illinois State Board of Education*
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